

Mining

CONGRESS JOURNAL

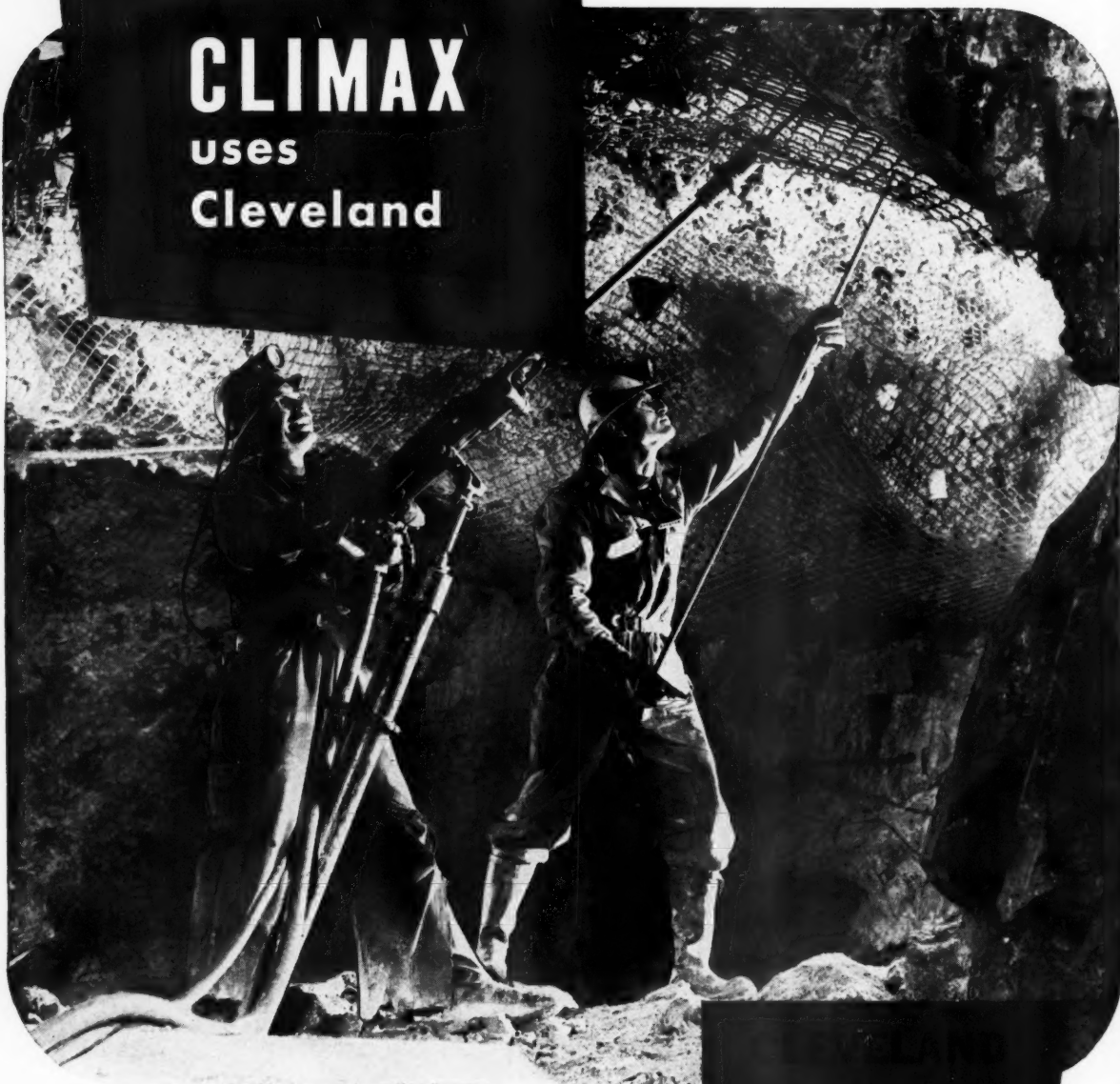


NOVEMBER
1955



CLIMAX

uses
Cleveland



H10AL Drills with AL92 Telescopic Air Legs for slusher drift development. These drill combinations not only drill the 8' blast round but also the 7' roof bolt holes. In addition they are also used to tighten the roof bolts and expansion shells to tension resistance in excess of 12 tons. These results are obtained through CLEVELAND superiority in drilling speed, handling and exceptional rotation.

You may test the superior qualities of any CLEVELAND drill in your own mine. Write for Bulletin RD30.

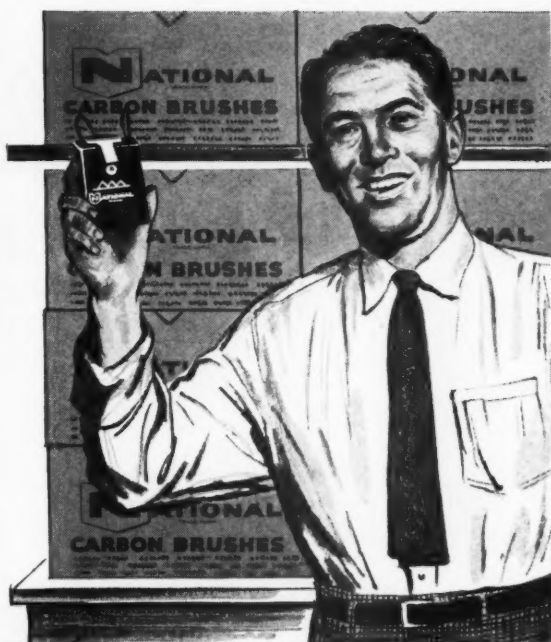
Represented in Colorado, Utah and Wyoming by: Denver Machine Shop, 1409 Blake St., Denver, Colorado and S & M Supply Company, 735 4th Ave., Grand Junction, Colorado.

Westinghouse
Air Brake Company





BEST BRUSH...



BEST BRUSH LINE...

NATIONAL BRUSHES TRADE-MARK

Your best bet, from individual application to your entire mine or mill requirement, is "National" brushes...best because they give you maximum machine efficiency at minimum brush cost.

Here's why:

PROVED GRADES

Grades to suit every operating condition... widest selection in the industry.

RESEARCH AND DEVELOPMENT PROGRAM

Active, sustained program assures new brushes for new-design machines; continually improved brushes for existing machines.

TECHNICAL SERVICE

Helps you get best electrical performance and reduce maintenance costs...streamlines brush-buying practice.

Start saving brush dollars now in operation, ordering and handling...Specify "National" brushes and be confident of top performance throughout your mine or mill.

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY

A Division of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, New York

Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco

IN CANADA: Union Carbide Canada Limited, Toronto

SYMONS[®]

CRUSHERS and SCREENS

have been serving
CLIMAX MOLYBDENUM COMPANY
 for over 25 years



***This Nordberg Machinery dependably serves CLIMAX
 in its expanding production of molybdenum***

- 60-IN. SYMONS PRIMARY GYRATORY CRUSHER ● TWELVE 7-FT. SYMONS CONE CRUSHERS
- TWENTY-FIVE SYMONS ROD DECK SCREENS

High up in the Rockies in Colorado is the miracle mine of modern times. Its immensity marks an achievement unequalled in the industry and its glamour parallels to a marked degree the romance which has woven its way through mining history. Here, two and one-third miles above the level of the sea is located Climax Molybdenum Company . . . presently the largest underground mining operation in North America and the largest producer of molybdenum in the world.

As the percentage of pure molybdenum present in molybdenite ore is generally low and as it is usually found disseminated through hard, crystalline rocks, the importance of a successful method of reduction crushing can be appreciated. As early as 1927, Climax recognized the inherent advantages of Symons Cone Crushers. Later, after extensive testing of all types of screens, Climax standardized on the Symons Rod Deck.

Today, the greatly expanded Climax production depends to a large degree on Nordberg Machinery . . . a 60-inch Symons Primary Gyratory Crusher . . . TWELVE 7-ft. Heavy Duty Symons Cone Crushers . . . and TWENTY-FIVE Symons Vibrating Rod Deck Screens.

For at CLIMAX . . . as in all of the great ore and industrial mineral operations the world over . . . NORDBERG MACHINERY is the outstanding preference among leading producers for processing great quantities of finely crushed and screened product at low cost.

Write for further information on the machinery you need for the profitable reduction of ores and minerals.

Record of Symons Crusher and Screen Installations at Climax:

SYMONS CRUSHERS

1927—**1** 4' Standard

1930—**1** 5½' and

1 7' Standard

1933—**1** 5½' Standards

1935—**2** 7' Short Heads

1936—**2** 7' Standards

1 7' Short Heads

1937—**2** 7' Short Heads

1952—**1** 7' Short Head

1953—**1** 7' Short Head

1 60" Primary
Gyratory

SYMONS SCREENS

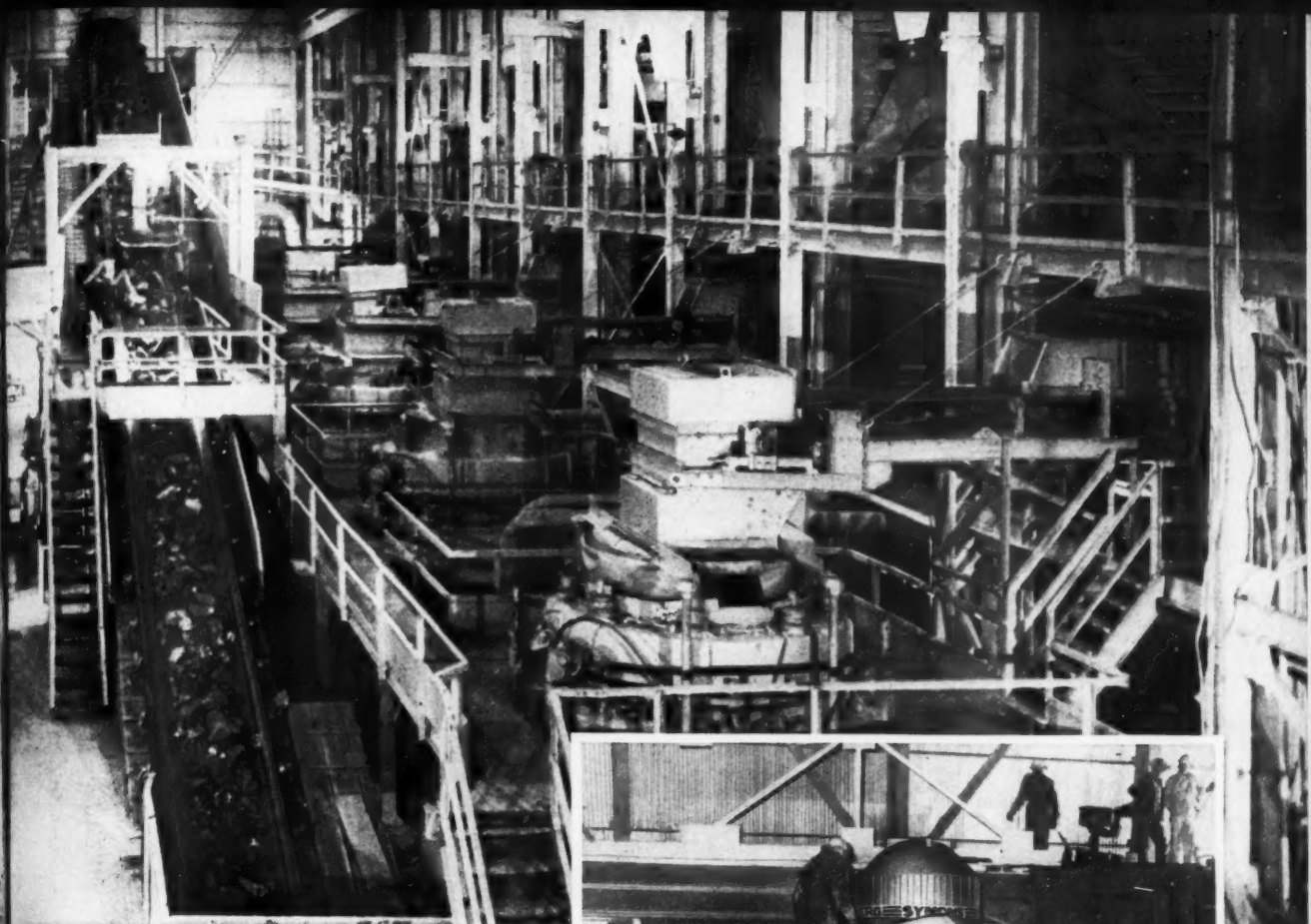
1941—**2** Rod Decks

1942—**2** Rod Decks

1943—**2** Rod Decks

1953—**2** Rod Decks

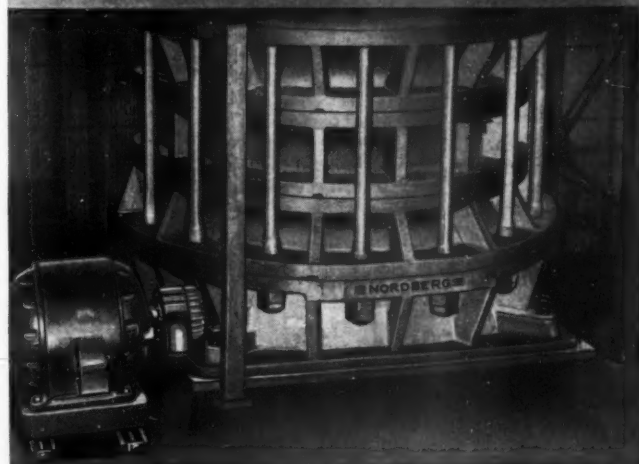
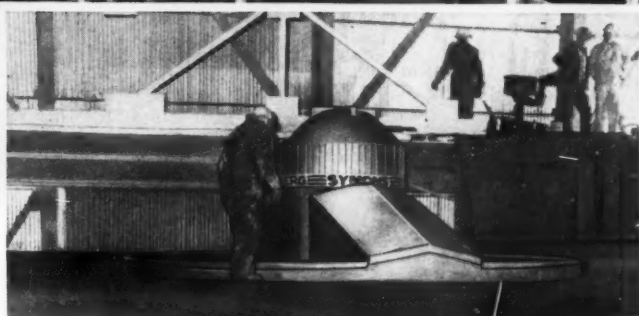
NORDBERG MFG. CO., Milwaukee, Wisconsin



Above: Five of the 12 Symons 7-ft. Heavy Duty Cone Crushers installed at Climax.

Right: 60-in. Symons Gyratory Crusher used for primary breaking at the new Storke Level plant at Climax.

Below: Two of the 25 Symons Vibrating Rod Deck Screens installed at Climax.



C655

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NORDBERG



MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON
TORONTO • MEXICO, D.F. • LONDON • JOHANNESBURG

SYMONS...

**A REGISTERED NORDBERG TRADEMARK
KNOWN THROUGHOUT THE WORLD**



Improved Du Pont CD Blasting Machines

FASTER OPERATION—LESS MAINTENANCE

Improved performance during an extra-long service life is what you get from the newer Du Pont CD Blasting Machines.

Designated CD-32-1 and CD-48-1, these newly designed machines maintain the condensers in a fully charged condition at all times . . . preventing condenser deterioration and reducing current drain from the batteries to a negligible quantity. This keeps the condensers at the same potential as the batteries. Result: greatly pro-

longed battery and condenser life, less need for service in the field.

The continuous-charge feature also eliminates the elapsed time between depressing the ready switch and the lighting of the neon lamp. As soon as the ready switch is pressed, the light glows, and the blast can be fired at once by pushing firing button. Result: faster operation.

These powerful, efficient machines retain the excellent characteristics of all CD Blasting Machines: light-

weight . . . great safety . . . no moving parts . . . absence of costly permanent shooting lines . . . ability to fire large numbers of caps in series or parallel series.

If you would like complete information on the improved CD-32-1 and CD-48-1 Blasting Machines, see the Du Pont explosives representative in your area, or write to E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Del.

OWNERS OF CD-32 and -48 BLASTING MACHINES may have them converted to the improved CD-32-1 and -48-1 machines for a moderate charge. Ask the Du Pont representative in your area for details.

DU PONT EXPLOSIVES

Blasting Supplies and Accessories


REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

NOVEMBER, 1955

VOLUME 41 • NUMBER 11

Mining

CONGRESS JOURNAL

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FRONT COVER: Massive, scenic mountains of Colorado nestle the Pandora mill of Idarado Mining Co. in their midst

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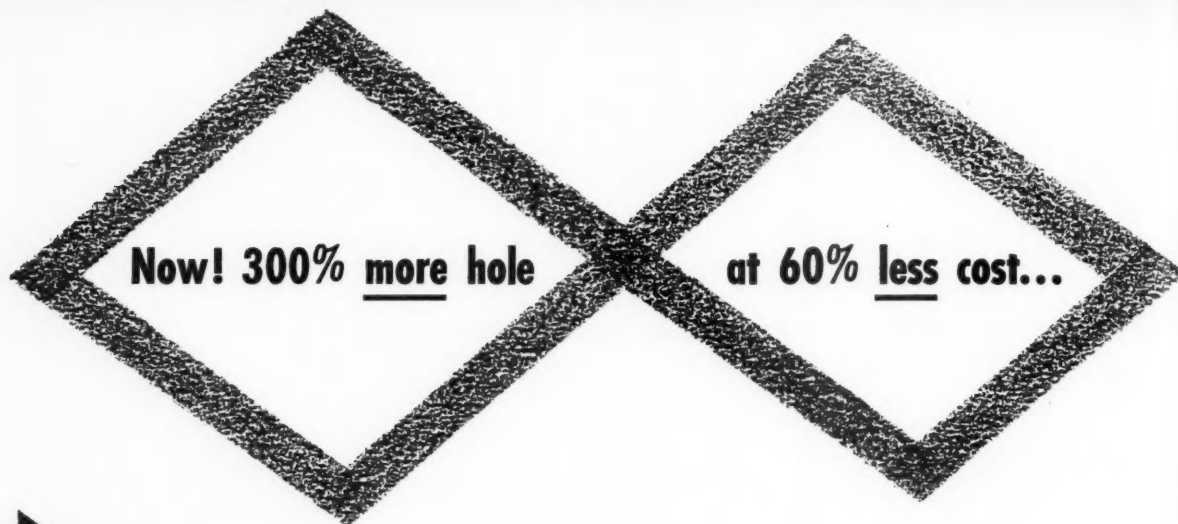
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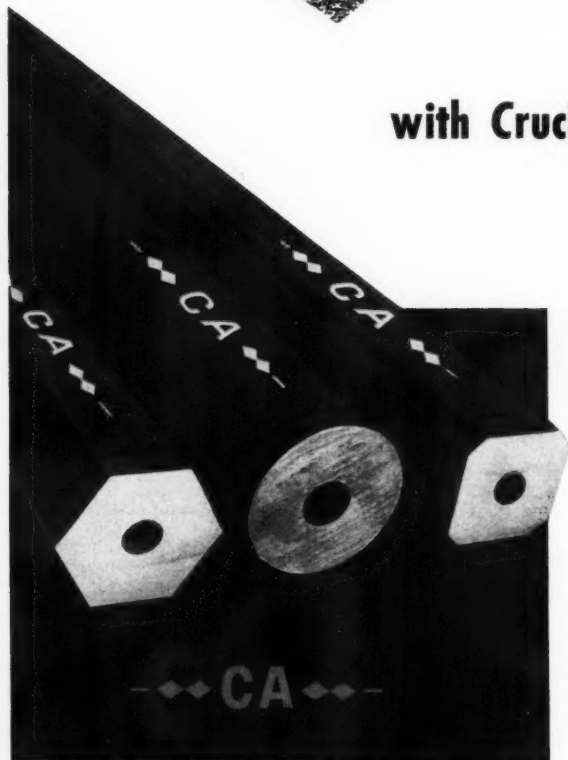
JULIAN D. CONOVER
Exec. Vice-President and Secretary



Member
Audit Bureau of Circulation



with Crucible **CA DOUBLE DIAMOND**
alloy hollow drill rods



That's the phenomenal results construction men are getting with Crucible's new CA DOUBLE DIAMOND alloy hollow drill rods.

These new rods actually have *three times* the drilling life of ordinary carbon rods. On one major construction job CA DOUBLE DIAMOND alloy rods averaged *630 feet per rod*. And, although they are slightly higher in price, these longer-lasting rods cut costs by 60%.

It's the *steel* that makes the difference. For CA DOUBLE DIAMOND is a tough, high-carbon, high-chromium *alloy steel*, *prescription-made* for maximum resistance to wear and abrasion. What's more, its hardness in the natural or as-rolled condition is substantially higher than carbon rods. You get a stronger rod with higher fatigue resistance.

With CA DOUBLE DIAMOND, as with any alloy steel, special heat treating methods give the best results. And they'll pay off in longer rod life... lower drilling costs. Crucible will be glad to supply full information on CA DOUBLE DIAMOND alloy rods... or on its many other alloy steels for construction applications. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE

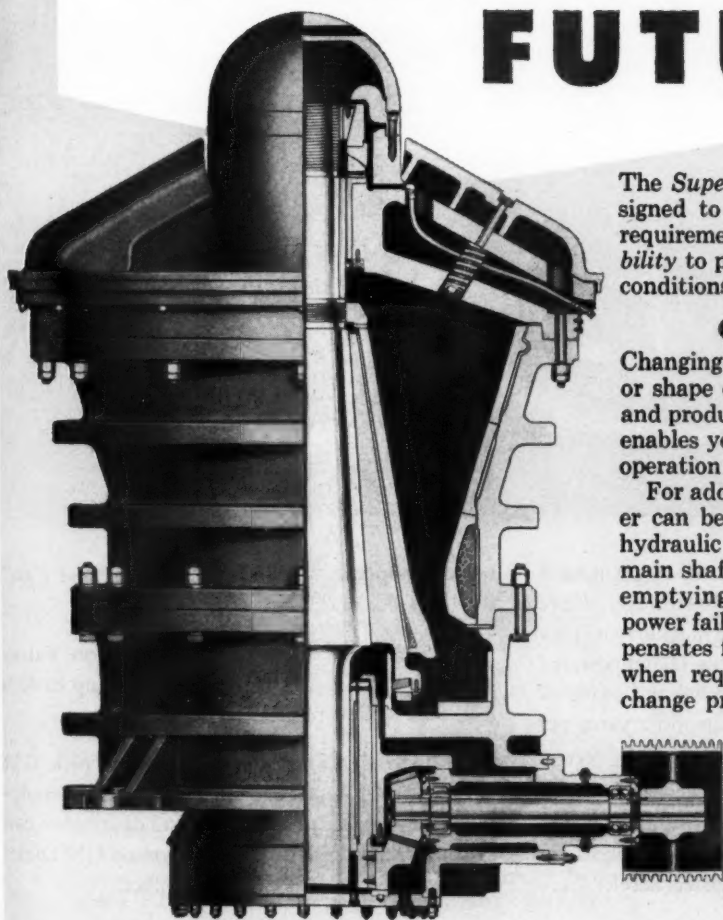
first name in special purpose steels

Crucible Steel Company of America

SUPERIOR Primary & Secondary **CRUSHER**



Meets your needs
TODAY and in the
FUTURE!



The *Superior* crusher you install today is designed to meet your specific and immediate requirements — and it also has *built-in flexibility* to permit adaptation to future operating conditions.

Complete Adaptability

Changing the eccentric throw, crusher speed or shape of crushing chamber, varies capacity and product size. This high degree of flexibility enables you to obtain the best possible crusher operation to suit other plant equipment.

For additional flexibility, the *Superior* crusher can be fitted with *Hydroset* mechanism, a hydraulic arrangement for raising or lowering main shaft and mantle. This control facilitates emptying the crushing chamber in case of power failure or other emergencies. It also compensates for wear on concave and mantle and, when required, makes it possible for you to change product size instantly.

Write for Bulletin 07B7870

This 32-page bulletin describes the *Superior* crusher and gives you valuable crushing data. It's a book you'll want to have and keep. Ask your A-C representative for a copy or write Allis-Chalmers, Milwaukee 1, Wis.

A-4455

Superior and Hydroset are Allis-Chalmers trademarks.

ALLIS-CHALMERS



**GM DIESEL
CASE HISTORY No. 556-188**

OWNER: Badgett Mine Stripping Corporation, Madisonville, Ky.

INSTALLATION: GM "6-110" Diesel-powered Bucyrus-Erie 3-yard shovel loading fleet of GM Diesel-powered Euclid rear dumps on Pennsylvania Turnpike extension project.

PERFORMANCE: Partner Brown Badgett says GM Diesels are "doing a wonderful job." He's running his shovel 10 hours a day, plans to start 24-hour operation soon.

"Doing a Wonderful Job"



FEW WOULD expect to find a mine-stripping contractor on a road-building job. However, where there's dirt and rock to be moved in a hurry it is *not* unusual to find a General Motors Diesel-powered excavator. The faster, livelier crowd and swing of a "Jimmy" powered shovel means more yards per day at a lower cost per yard.

Principal reason for this snappy action is that a GM 2-cycle Diesel delivers power on *every* piston downstroke—not on every *other* downstroke as in 4-cycle engines. That means faster acceleration,

instant response to throttle demands, real "go" when the bucket takes a bite.

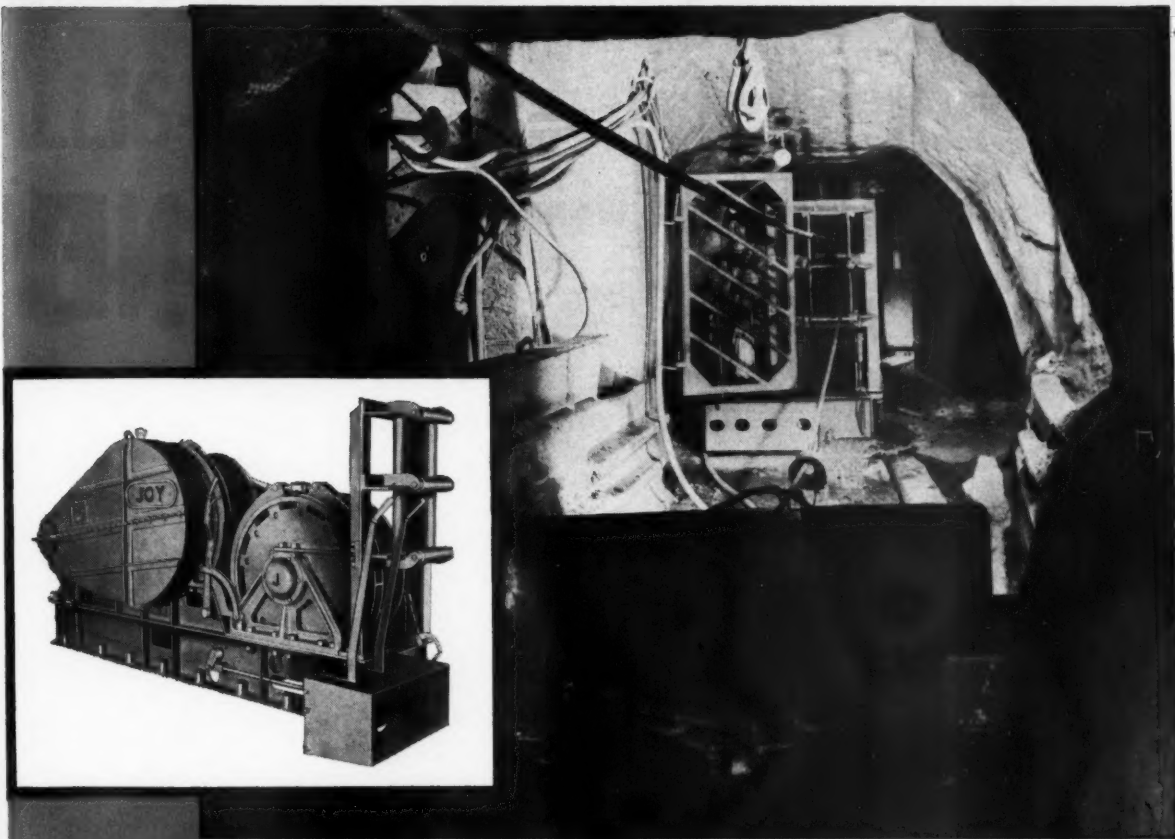
And a GM Diesel costs less to maintain, too. Valves cost up to 62% less, cylinder liners cost up to 40% less, than similar parts for other Diesels.

More than 150 different manufacturers pick GM Diesel power for over 850 different models of equipment they build. Your GM Diesel distributor can give you the list plus full information on GM Diesel engines. See him today or write direct.

DETROIT DIESEL
ENGINE DIVISION OF GENERAL MOTORS

America's Largest Builder of Diesel Engines
Single Engines . . . 30 to 300 H. P. Multiple Units . . . Up to 893 H.P.





BIG JOY EQUIPMENT

is the PAYOFF at CLIMAX

A mining system built around the use of high-capacity, heavy-duty scraping equipment has been the payoff at Climax. Block caving into slusher drifts, which will accommodate a 6' folding scraper, has resulted in a saving of up to half of the cost of gravity-chute ore collection methods previously employed.

The 150 HP Joy XT-221, a large tandem two-drum slusher with chain drive, is used at Climax for this high-capacity slusher operation. Many of these heavy-duty machines work on a three-shift basis yet with remarkably low maintenance. During the loading of the first 3 million tons of ore from the Storke Level at Climax by 23 Joy XT-221 Slushers, *the only repair charge was for clutch band linings.*

The Joy XT-221 is the largest model in a complete line of rugged scraping equipment expressly built for heavy underground duty. The line ranges from the 5 HP Model S-221 to 150 HP units such as the one illustrated above in a Climax drift, and includes models which will solve most scraping problems. For complete information on Joy Slushers, write *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



Consult a Joy Engineer

for AIR COMPRESSORS, ROCK DRILLS, CORE DRILLS,
HOISTS and SLUSHERS, MINE FANS and BLOWERS

W&D M5737

JOY

**WORLD'S LARGEST MANUFACTURER OF
UNDERGROUND MINING EQUIPMENT**

more performance . . .

FOR SUSTAINED HIGH OUTPUT!

more versatility . . .

FOR A WIDER RANGE OF WORK!

more dependability . . .

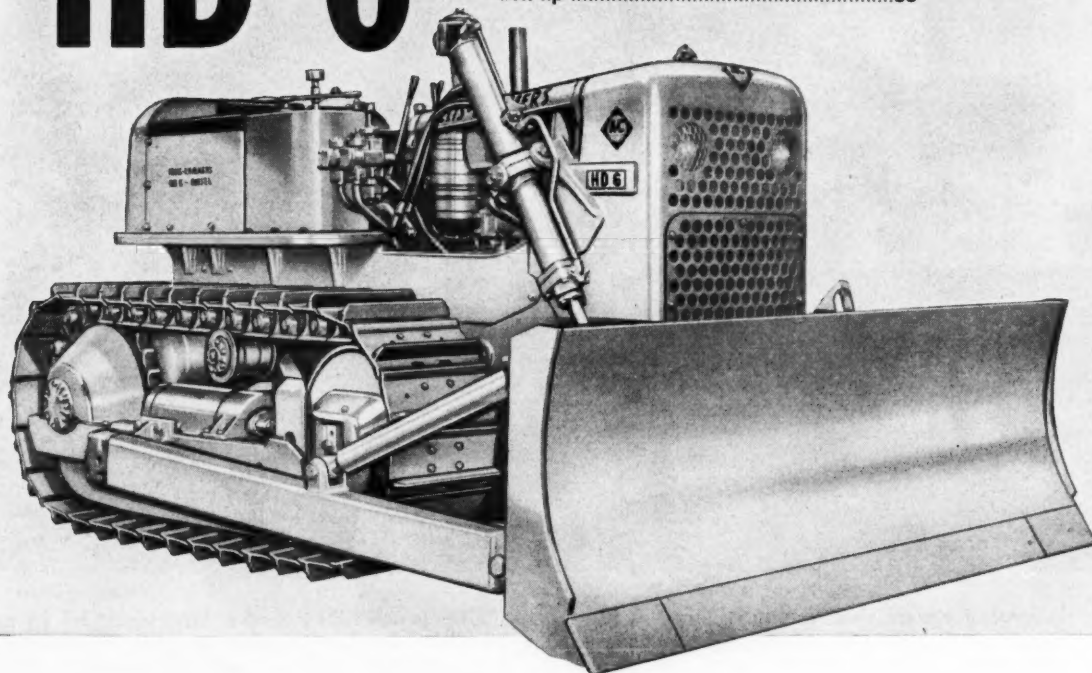
FOR LOWER JOB COSTS!

TWO NEW

HD-6

BULLDOZER-DRAWBAR TRACTOR

Weight	12,400
Drawbar hp	45
Belt hp	55



STEP UP PERFORMANCE, CUT JOB COSTS

WITH EXCLUSIVE HD-6 FEATURES LIKE THESE...

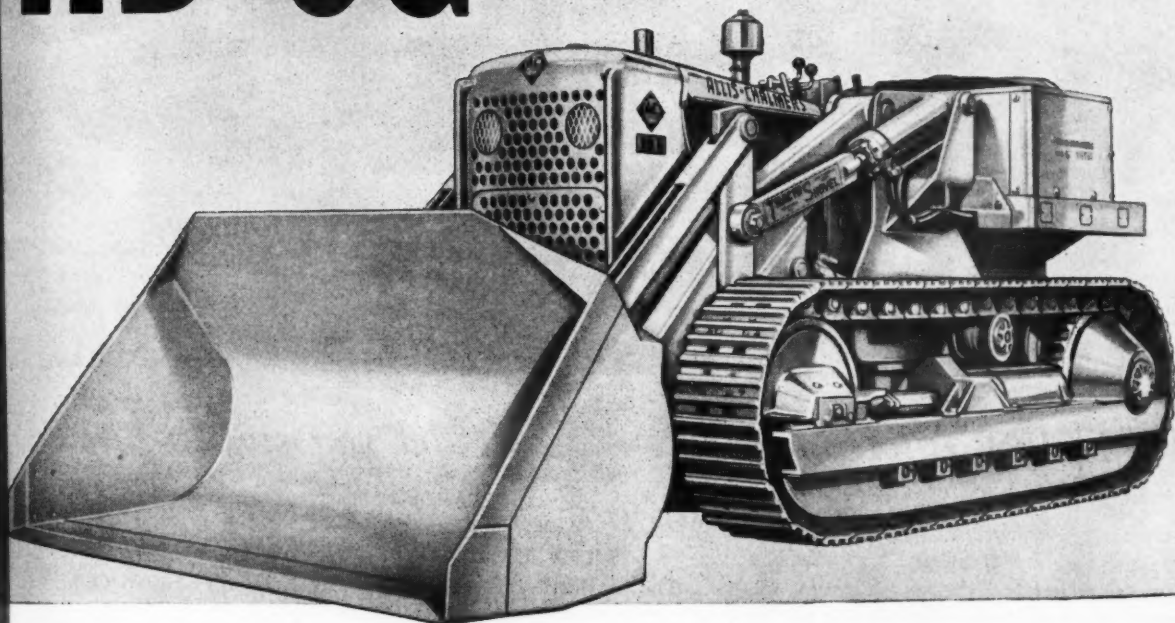
- ★ Allis-Chalmers heavy-duty diesel engine — with “follow-through” combustion for long life, low upkeep.
- ★ 24-volt direct electric starting — for convenience and efficiency (standard equipment).
- ★ Wrap-around radiator guard for maximum strength and protection . . . tilts forward for easy service.
- ★ Ceramic master clutch lining — lengthens clutch life, reduces lever pull.
- ★ All-steel box-A main frame — protects the entire power train, makes possible superior balance . . . plus the service simplicity of unit construction.
- ★ One-piece steering clutch and final drive housing — for maximum strength, accurate bearing and gear alignment.
- ★ Double reduction final drives (straddle-mounted on tapered roller bearings) provide maximum ground clearance.
- ★ Roller bearing truck wheels — with Positive Seals that keep dirt and moisture out . . . grease in.
- ★ 1,000-Hour lubrication intervals for truck wheels, idlers and support rollers.
- ★ Tru-Dimension tracks — with new standards of strength and hardness *throughout* for extra wearability.
- ★ Unit construction — major assemblies like engine, clutches and final drives can be removed without disturbing adjacent parts.
- ★ Engine-mounted bulldozers — for top dirt-moving performance and extra tractor life.

ALLIS-CHALMERS ANNOUNCES HD-6 SERIES TRACTORS

HD-6G

TRACTOR SHOVEL

Weight	19,600
Drawbar hp	45
Net engine hp	57
Bucket capacity	1-1/3 cu yd



...PLUS TRACTOR SHOVEL FEATURES LIKE THESE...

- ★ Extra long track (almost 7 ft on the ground) with six truck wheels per side — for real stability throughout the digging and loading cycle.
- ★ New two-position bucket — for easy full-capacity loading in any material (standard equipment).
- ★ Heavy-duty shovel assembly — built right into the tractor, not just an attachment.
- ★ Simple, safe hydraulic system — with no exposed hoses or fittings on cowl or deck.
- ★ Two-speed reverse, high foam-rubber seat and easy bucket control — for new tractor-operator efficiency.

GET ALL THE FACTS NOW FROM YOUR NEARBY ALLIS-CHALMERS DEALER

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



MAKE ONE DRILL STEEL DO THE WORK OF MANY!



*TIMKEN® interchangeable rock bits let you switch bits
without switching drill steels*

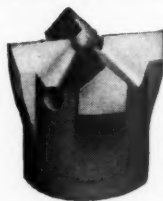
IT pays to switch bit types as the ground changes. The most economical way to do this is to use Timken® carbide insert and multi-use rock bits. In less than a minute, drillers can unscrew one type of Timken bit and screw on a different one—right on the job. No time wasted going after another set of drill steels. No need to stock expensive double inventories because dozens of Timken carbide insert and multi-use bits are interchangeable on the *same* drill steel.

When you use Timken interchangeable rock bits, you know your drillers will always have the most economical bit for the ground being drilled—Timken multi-use bits for ordinary ground, Timken carbide insert bits for hard, abrasive ground.

Both of these Timken rock bits give you two important advantages: 1) they are made from electric furnace Timken alloy steel, 2) a special shoulder union keeps drilling impact from damaging threads.

Our rock bit engineers may be able to help you with your drilling problems. They're experts in cutting drilling costs. There's no obligation. Write The Timken Roller

Bearing Company, Rock Bit Division, Canton 6, Ohio.
Cable address: "TIMROSCO".



WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.



WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant-gauge holes, small diameter holes, very deep holes.

... your best bet
for the best bit...
for every job

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.



Bucyrus-Erie 950-B stripper removes overburden from Traux-Traer Coal Company seam in Fulton County, Illinois. Operation is one of the largest open pit mines in Fulton County, Illinois' second biggest coal producing county. CALUMET Viscous provides lubricant shield for roller swing gear.

Bob Wright, Standard's lubrication specialist, mounts steps to inspect roller swing gear lubricated with CALUMET Viscous. On-the-spot technical help such as this is one of the services Bob performs for his customers. Bob's training includes a B.S. in engineering from Michigan College of Mining, and Bob has completed the Standard Sales Engineering School. Customers find such training pays off for them.

Stripper rides on CALUMET Viscous Lubricant

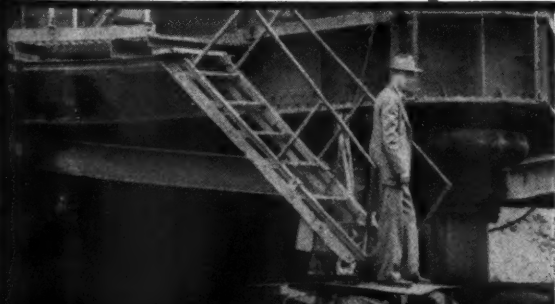
CALUMET Viscous Lubricant has been assigned the job of protecting circle rail rollers and swing gears on a 950-B Bucyrus-Erie stripper at Traux-Traer Coal Company's mine in Fulton County, Illinois. It's been doing this job—and doing it well—for many years. It has had to, for delivering top performance is expected of both lubricants and equipment at this mine. The production goal is a stiff 1,000 tons of coal an hour.

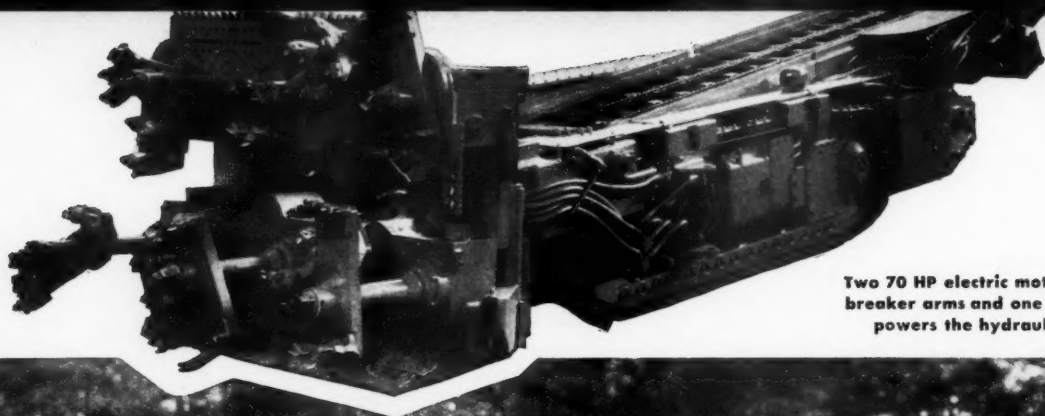
The stripper operates continuously in all kinds of weather—hot, cold, wet, dry, dusty. Selection of CALUMET Viscous Lubricant for this job was a logical decision. CALUMET Viscous is designed to perform under just such conditions. Its adhesive qualities make it stick to gear surfaces and form a near perfect gear shield. It doesn't sling off during warm weather or chip off in cold weather. It can be applied easily and evenly when sprayed or swabbed, does not require preheating.

CALUMET Viscous is one of a large number of lubricating greases in the Standard line. In the Midwest, a lubrication specialist from your nearby Standard Oil office will be happy to tell you about them. Call him today, or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

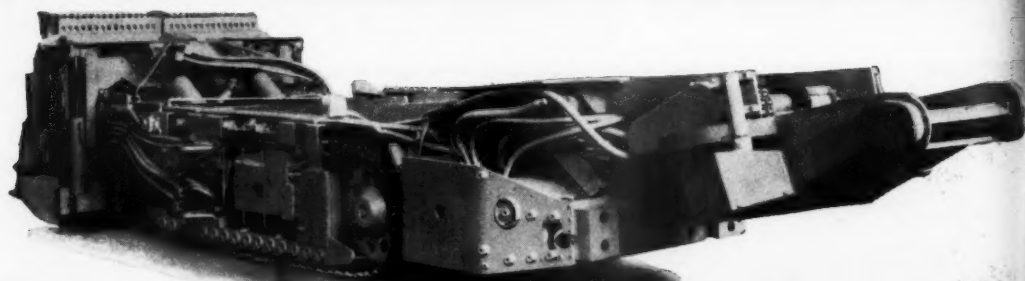


STANDARD OIL COMPANY (Indiana)





Two 70 HP electric motors drive the breaker arms and one 50 HP motor powers the hydraulic system.



The Colmol can be turned around in its own length.

Up to 100 tons per man-shift...

continuous mining in medium height veins

with the

76-B JEFFREY COLMOL®

(PATENTED)

A COLMOL working a West Virginia seam with a crew of seven has produced 900 tons of coal in a single shift—an even better record than the 100-ton per man-shift figure normally set as a goal for this powerful Jeffrey continuous mining machine. Evidence again of the high tonnage production possible with the Colmol.

Ten sturdy rotating cutters attack any coal seam ranging from 46½" to 72" in height, according to the model chosen. All coal in an area 9'8" wide is brought down, swept into the conveyor, and is discharged at the rear. The cutter arms operate at a speed of less than 60 RPM, breaking off the coal and producing a screen consist comparable, in most seams of coal, to conventional mining.

This 70,000-pound giant advances steadily on long, wide crawlers with little noise, vibration or dust. The head can be raised, lowered or tilted to follow irregularities in the seam. The discharge conveyor swings 31 degrees to either side, to make loading into a shuttle car easy. All adjustments are hydraulic and can be made instantly and accurately. Controls are centralized for convenience and safety; once they've been set, they need very little attention, reducing operator fatigue.

The Colmol is sturdy, suiting it to the toughest mining jobs. Operating parts, both electrical and hydraulic, are readily accessible. Thus servicing, minor repairs and adjustments can be made at the face, holding downtime to a minimum.

If you're thinking of new continuous-mining equipment, ask to hear Jeffrey's story on the 76-B Colmol. Its high productive capacity and the long, trouble-free service it provides will make it a moneymaker for you.

Write to: Mining Sales Division, The Jeffrey Manufacturing Company, Columbus 16, Ohio. District Offices in: Beckley, Birmingham, Chicago, Denver, Pittsburgh, Harlan, Salt Lake City.

3 MODELS

HEIGHT OF CUT:

46½" to 55"

50½" to 64"

56½" to 72"

WIDTH OF CUT: 9'8" approx.

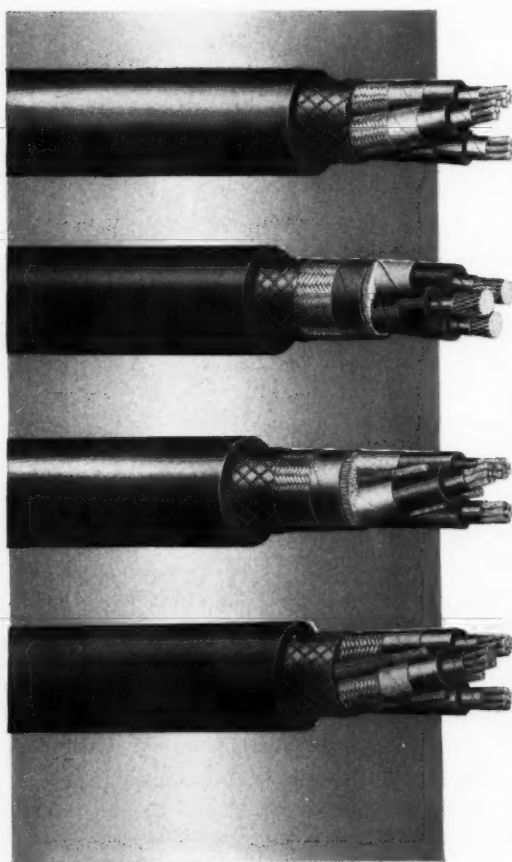


JEFFREY

**MINING, CONVEYING, PROCESSING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING**

Avoid costly "Downtime" with U. S. Royal Shielded Portable Power Cables

Shielded Portable Power Cables, Type SH, are preferred (or generally used) for the distribution of power to portable equipment at voltages above 2000. Shielded cables provide greater protection to the insulation and are safer to handle than other types of portable cables. These cables are of the four types listed below. Where maximum safety is desired, type SH-D cables are recommended.



U. S. Royal SH-A Cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound, and covered with colored tapes and a braided coated copper shield. The conductors are then cabled and covered with a reinforced jacket of 60% black neoprene. The shielded braid over each insulated conductor eliminates corona cutting by static discharge through equalization of surface stresses.

SH-B cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound plus colored tapes. Conductors are then cabled with jute fillers, covered with a rubber-filled tape, a braided coated copper shield and reinforced 60% black neoprene jacket. The shielding braid protects the men handling the cable in the event of fault currents.

SH-C cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape. The conductors are cabled with jute fillers and with the specified fabric-covered ground wires in the conductor interstices; then covered with a rubber-filled tape, braided coated copper shield and a reinforced 60% black neoprene jacket. This allows grounding of equipment and provides an adequate low-resistance path for short circuits, thus insuring circuit breaker operation. The grounded equipment provides protection to workmen under fault conditions.

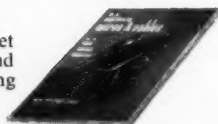
SH-D cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape and a braided coated copper shield. The conductors, together with fabric-covered grounding conductors, are cabled and covered with a reinforced black 60% neoprene jacket. The conductor shielding, when properly grounded, equalizes surface stresses and draws off all capacity charging currents, insuring safety in handling. An adequate low-resistance ground for the equipment is provided by the grounding conductors.

All shields and grounding conductors, when used, should be properly and thoroughly grounded.

The constant dragging, flexing, twisting and bruising encountered in heavy service will not bother U. S. Royal Shielded Cables. You'll find that U. S. Royal never runs you into "downtime"—it's the most dependable, efficient cable you've ever used.

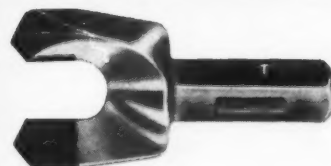
United States Rubber Company is the only electrical wire and cable manufacturer to grow its own natural rubber, make its own synthetic rubber and its own plastics. This permits control of the production process—resulting in a quality product.

Send for illustrated booklet on U. S. Electrical Wires and Cables for the coal mining industry.



UNITED STATES RUBBER COMPANY
ELECTRICAL WIRE AND CABLE DEPARTMENT, ROCKEFELLER CENTER, NEW YORK 20, N. Y.





Bit cost reduced 51 percent at Peters Creek Coal Company using Kennametal* D-3-inch Bits

High in the mountains of southern West Virginia, the Peters Creek Coal Company is maintaining a shift average of a brisk 21-ton per man mining out fingers of its Eagle Seam using Kennametal D-3-inch Bits.

In this seam, mining is normally limited to the 28-38 inches of coal sandwiched between two bone bands. This coal is exceedingly difficult to cut and drill, and face preparation requires major attention.

Kennametal Bits are used by the Peters Creek Coal Company as a result of drilling tests made several years ago as a part of a modernization program to increase production. For a two-month period, conventional steel and Kennametal D-3-inch Bits were tested. Accurate bit cost records proved that, during that period, the cost of conventional steel bits was \$187.00. The cost of the Kennametal Bits was \$92.50 . . . a saving of over 50 percent.

You learn to expect this type of performance when you use Kennametal. When next you buy, be sure to specify these quality, sintered carbide bits. They'll cost you less in the long run. Write to KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

* Registered Trademark

The best measure of tool performance is bit cost per ton of coal

Peters Creek Coal Company, like other practical mine operators, has found that there is only one measure of mining tool performance . . . that is, *bit cost per ton*.

Why not let your Kennametal Mine Service Representative demonstrate Kennametal's ability to help you hold bit cost down to a minimum by showing you actual performance records? You will find not only that Kennametal Bits last longer, make drilling easier, improve rates of penetration, and increase coal production, but also that Kennametal Bits need reconditioning less often and cause little strain on equipment.

These records are due to one factor . . . Kennametal is the only sintered carbide producer that owns complete facilities for production of tungsten carbide tools, from raw materials to finished product . . . and so is able to maintain rigid quality control throughout every stage of production from mining select ores through complex phases of refining and manufacturing. The end result is less bit cost per ton of coal mined.

8888



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DRILL BITS



ROOF BITS



MACHINE BITS



ROCK BITS

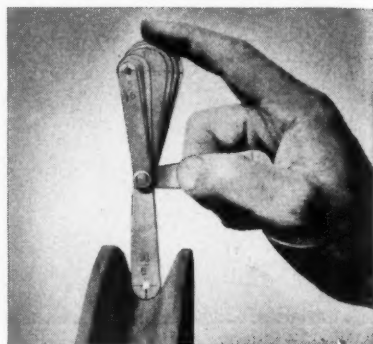
Tuffy tips on choosing the



Measure Groove Diameter Accurately

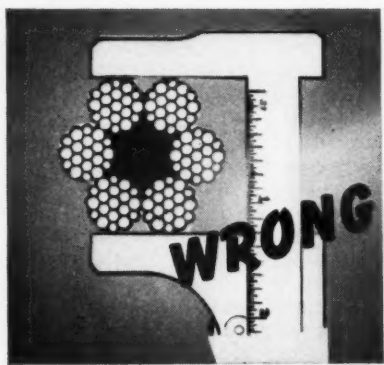


Shown above is the **WRONG** way to measure the groove diameter. The result—shorter life of the wire rope you buy. Note that only the sides of the rope will bear on the sheave. In a relatively short time this will squeeze the rope out of round and set up destructive friction and stresses on the rope strands and wires. New rope is over-size and diameter of grooves on sheaves and drums should be slightly larger.



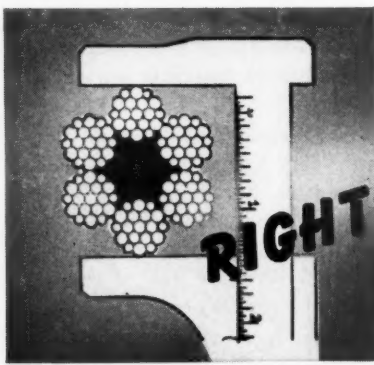
Shown above is the **CORRECT** way to measure the groove diameter. It is a simple thing to do and will give the rope you buy a chance to deliver all the service it possibly can. Remember a wire rope is composed of many closely correlated working parts and sheave grooves which are too large or too small throw them out of alignment. Just like any other working part on a machine, wire rope cannot do its best if it is misfitted.

If Present Rope Is Correct Size, Measure with a Caliper



Measuring the Wrong Diameter

is a common mistake that some buyers make when they order replacement rope. When the rope arrives, it turns out to be too small—even though a machinist's caliper was used to assure accuracy. It's an easy mistake to make, but it's just as easy to remember the **right** way and be sure you get the right size rope. Otherwise both the safety factor and service life of the rope will be reduced.



Measuring the Right Diameter

is the simple step shown above. Measure so that a single strand is on each of the adjustable edges of the caliper—not two strands that measure as a flat side. The actual diameter of a wire rope is the same as that of the circle required to circumscribe it. The diameter of a wire rope is an important factor in determining the safe working load to be handled by your equipment.

Replace Worn Sheaves



When Replacing Rope, check for sheaves that have been badly worn. Sheaves that have grooves corrugated by the rope lay impression should be replaced immediately before installing new rope. Since rope creeps to a certain extent on sheaves these grooves can actually cut the strands as the rope runs over. This will greatly reduce service life of *any* wire rope.

right replacement **Rope**

Beware of Critical Tread Diameters

It is highly important to accurately measure the tread diameter of the smallest sheave or drum on any machine. Here's why. It is on this sheave or drum that the wire rope will get the greatest wear. Some constructions of wire rope will work on smaller tread diameters than others without lessening their service life. Engineers have determined the critical tread diameter for different constructions as shown in the table at the right. Also shown in the table is the minimum recommended tread diameter which is 50% larger than the critical tread diameter.

Example, the tread diameter of your smallest sheave is 24 inches. You know that a 1-inch rope is necessary. Referring to the table at the right you see that the 6 x 19 Warrington or Filler wire is suitable because the minimum tread diameter recommended for it is 24 times the diameter of the 1-inch rope. This gives you a margin of 50% over the critical diameter of 16 inches. If flexibility is a factor in the operation then you would choose the Filler wire type of rope with fiber core.



Construction of Rope	Critical Tread Diameter	Minimum Recommended Tread Diameter
6 x 7	28	42
18 x 7	24	36
6 x 19 Seale	20	30
6 x 19 Warrington or Filler Wire	16	24
6 x 31	15	22
8 x 19 Seale	14	21
6 x 37	12	18
8 x 19 Warrington or Filler Wire	12	18

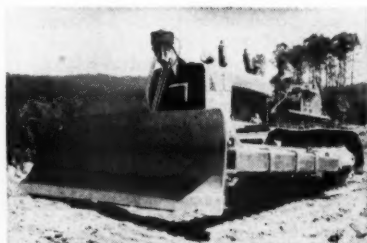
To arrive at critical tread diameter and minimum recommended tread diameter multiply the numbers above by the rope diameter.

Use The "Know How" of *Wire Rope* Specialists

Stemming from many years of cooperation with users and machine builders mastering wire rope problems, is a family of special ropes for special purposes. Into

each is incorporated the rope construction, the grade of steel and operating characteristics found to be best for the service for which each is intended.

When you specify one of the Tuffy Wire Ropes, you can say Tuffy and forget complicated specifications!



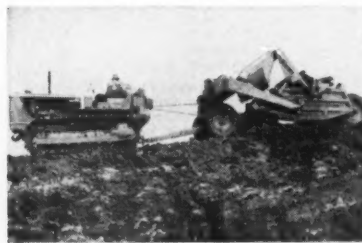
Tuffy Dozer Rope

Designed to take the punishment of small winch drums and small sheaves . . . the shock of blade manipulation under toughest going. In 150' reels for easy mounting on dozer.



Tuffy Dragline

Has the built-in extra stamina, flexibility and abrasive resistance needed for longer service in rugged mining work. Helps move more material per rope.



Tuffy Scraper Rope

Flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Plenty tough to fight off drum crushing. On easy-to-mount reels.



Tuffy Slings

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Tuffy Slusher Rope

Rigid, non-collapsing to eliminate drum crushing. Elastic and flexible to take shock loads and to better withstand abrasive wear in tough slusher loading.

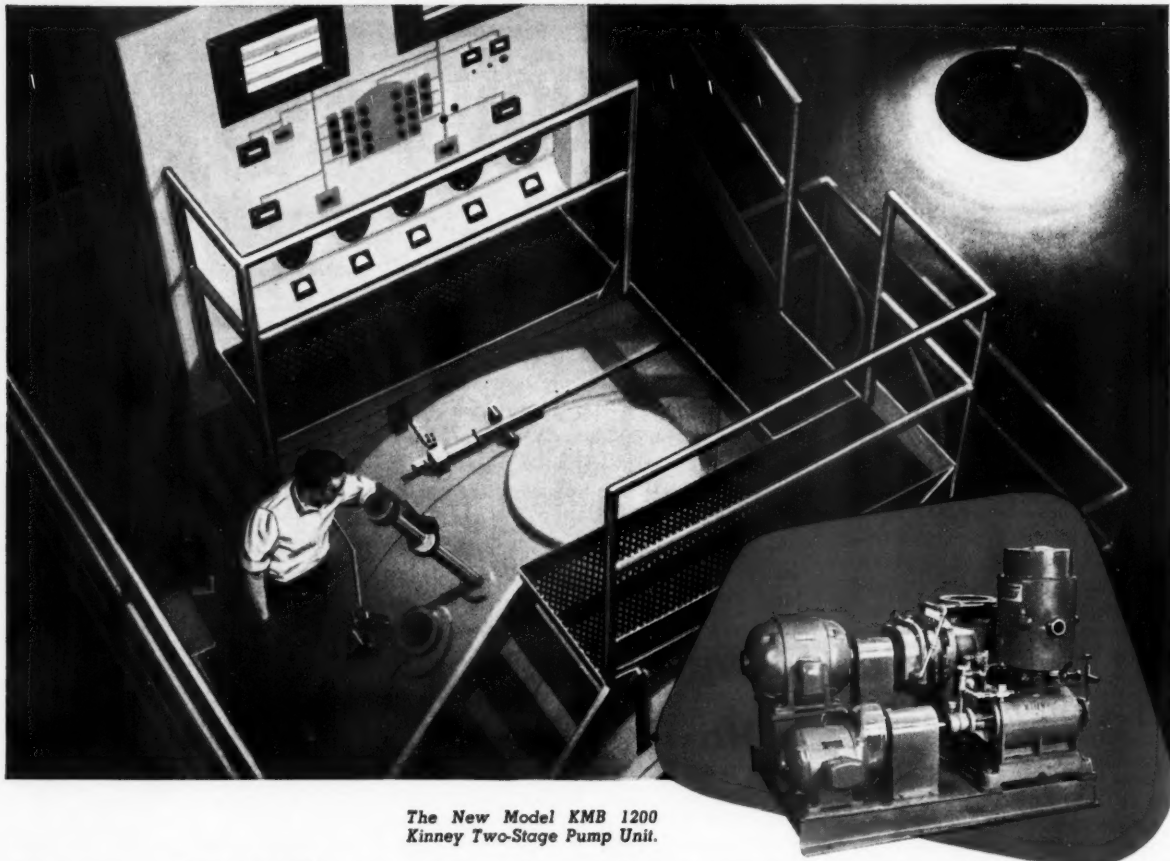
Your Tuffy Distributor Works For You

He's the man who can help you find a fast answer to all your wire rope problems. He's also the man who often knows as much about some requirements of your equipment as the men who made it. He's the man who's eager to supply the kind of service that will hold your patronage. Feel free to call on him anytime.

union Wire Rope corp.

2144 Manchester Avenue Kansas City 26, Missouri

Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric



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Kinney Two-Stage Pump Unit.

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Write for descriptive literature and engineering information to help you improve your product, speed production and lower costs.

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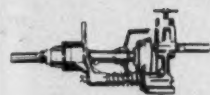
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INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

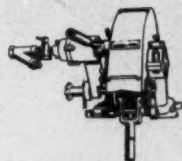
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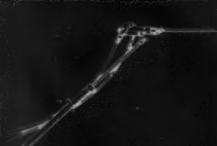
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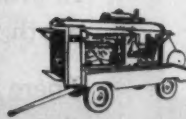
Throttles



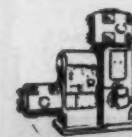
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There is no short cut to "building in" the finer, denser grain structure that gives Moly-Cop Balls their exceptional hardness and toughness for longer, even wear. If you want to get your biggest dollar's worth in grinding efficiency and economy, do what many leading mills around the world do — use Sheffield Moly-Cop Grinding Balls.

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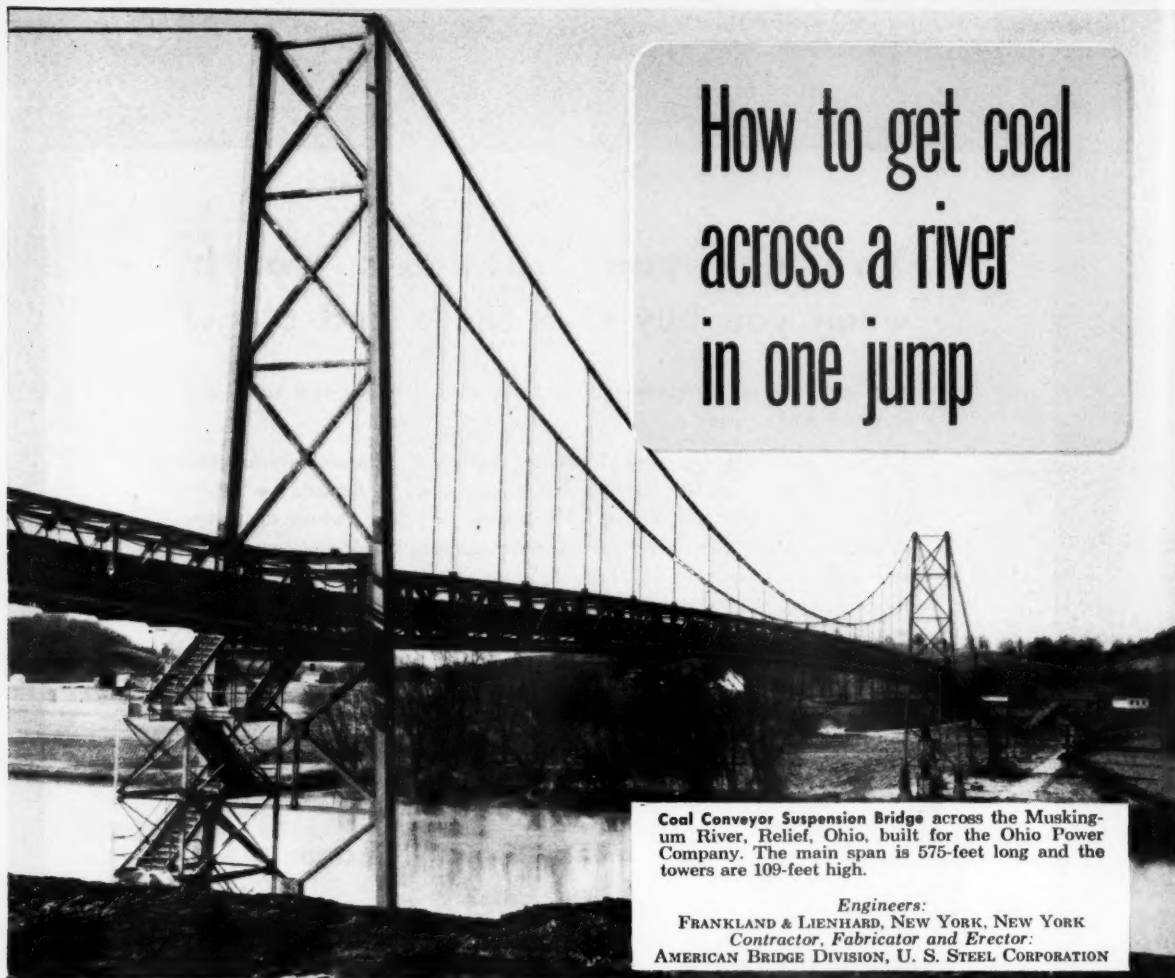
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How to get coal
across a river
in one jump

Coal Conveyor Suspension Bridge across the Muskingum River, Relief, Ohio, built for the Ohio Power Company. The main span is 575-feet long and the towers are 109-feet high.

Engineers:
FRANKLAND & LIENHARD, NEW YORK, NEW YORK
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AMERICAN BRIDGE DIVISION, U. S. STEEL CORPORATION

Conveyor Suspension Bridge, built with Tiger Brand Prestressed Bridge Strand, does the trick.

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Prestressing the strands to one-half their designed breaking strength for several hours is a thorough test of quality of the material. It also produces a cable strand that will not stretch over the years due to use.

American Steel and Wire Division has the engineering experience and complete manufacturing facilities to produce the finest bridge strand and wire rope you can buy. Call or write for further information or contact our nearest distributor. He's listed in the classified directory under "Wire Rope."

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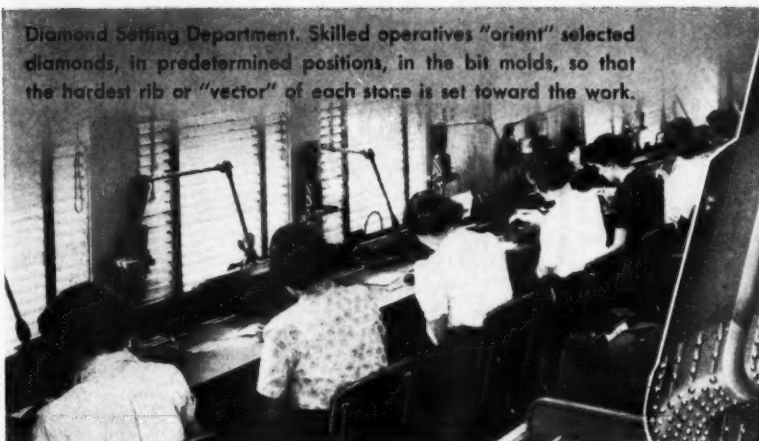
USS AMERICAN TIGER BRAND WIRE ROPE

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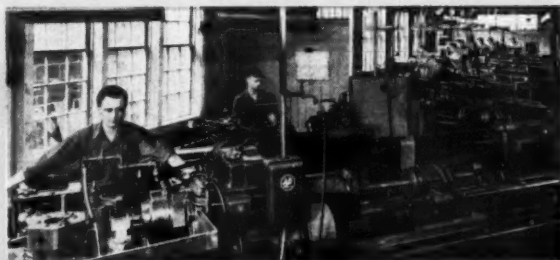


UNITED STATES STEEL

Diamond Setting Department. Skilled operatives "orient" selected diamonds, in predetermined positions, in the bit molds, so that the hardest rib or "vector" of each stone is set toward the work.



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Experience and Equipment
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ORIENTED
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Since standardizing on Oriented Diamond Bits, we have produced THOUSANDS, in a wide variety of types and sizes, with both cast and powdered-metal matrices, to meet every diamond drilling requirement, AT NO ADVANCE IN COST TO THE PURCHASER.

For either core drilling, or any other kind of diamond drilling, we believe these to be the most efficient and economical diamond bits ever produced and invite inquiries on that basis. Bulletin No. 320 illustrates and describes all types and gives complete working data. Write for a free copy and tell us about your drilling conditions. Our experienced executives welcome opportunities to make money-saving recommendations regarding the best type of matrix and most suitable grade of diamonds for any particular job.

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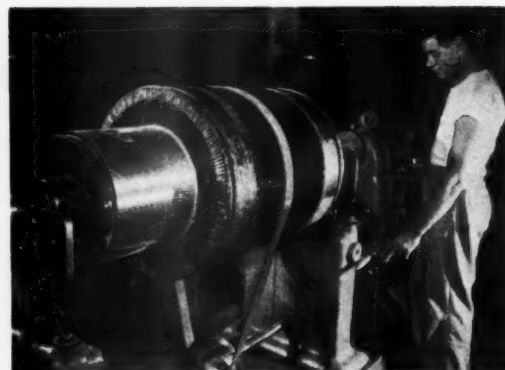
to keep your big stripping shovels on the job



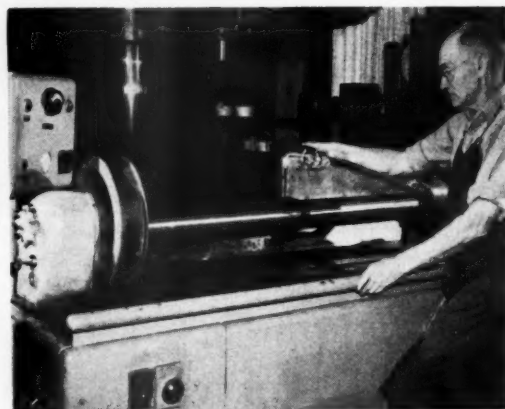
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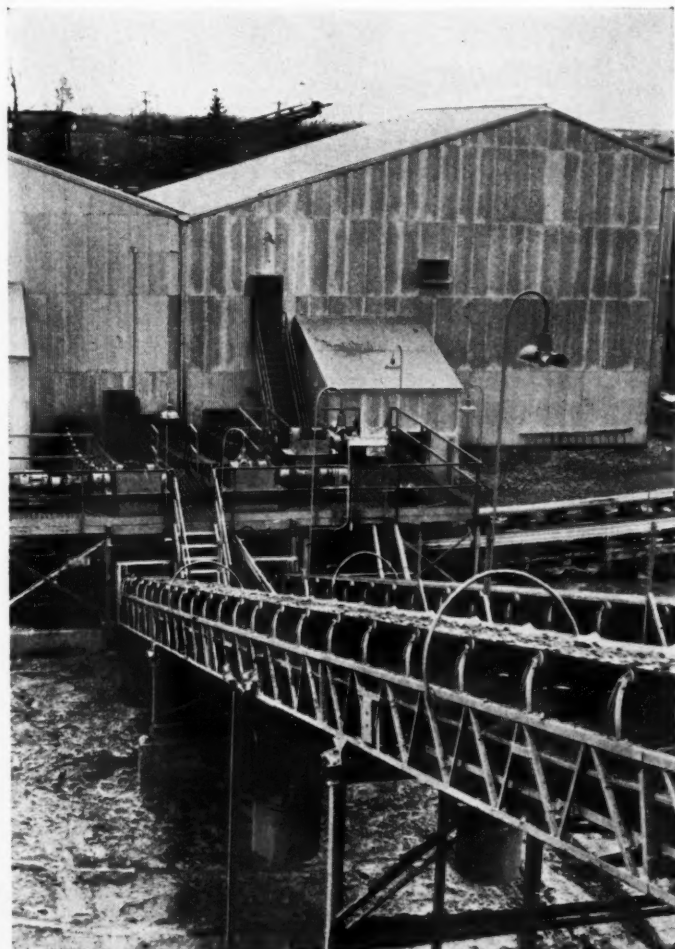
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LOWER COST PER TON-MILE

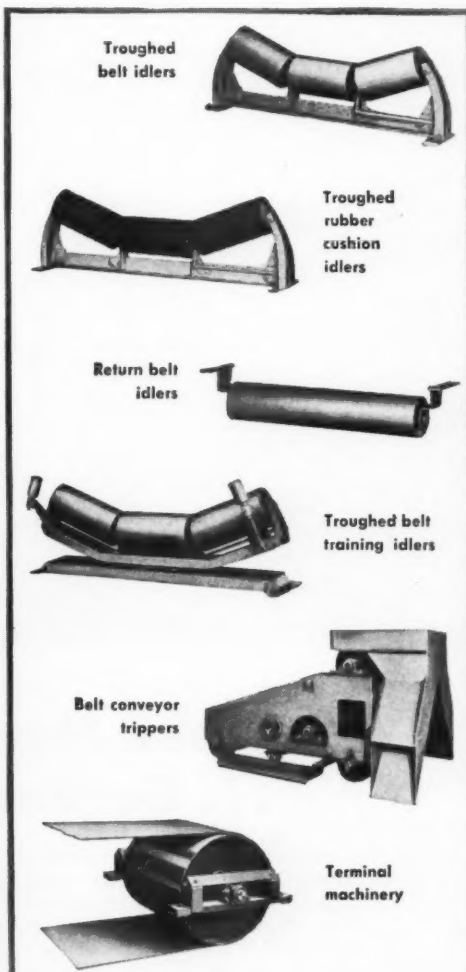
...yours with either a Link-Belt single belt conveyor or complete system

WHETHER you need a single belt conveyor or complete system, you'll find that Link-Belt engineering and equipment add up to lower cost per ton mile. Drawing from vast experience, our engineers can develop a system incorporating the most practical components from our complete line of quality idlers, trippers, drives, terminal machinery and other items. And if desired, we will handle erection.

Link-Belt has pioneered the development of belt conveyors for short or long hauls . . . indoor or outdoor service. To learn how this background can produce utmost economy per ton-mile in handling your bulk material, call your Link-Belt office.



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★ Mining ★

CONGRESS JOURNAL

Published for the Entire Mining Industry
by the AMERICAN MINING CONGRESS

ROBERT W. VAN EVERA, Editor

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NOVEMBER, 1955

Number 11

Your Health, Mr. President

AT the recent Convention of the American Mining Congress at Las Vegas, the following message was sent to President Dwight D. Eisenhower: "AT OPENING SESSION OF AMERICAN MINING CONGRESS CONVENTION HERE THIS WEEK ATTENDED BY OVER 3000 LEADERS IN THE MINING INDUSTRY, ENTIRE AUDIENCE ROSE FOR A MOMENT OF SILENT PRAYER FOR YOUR CONTINUED AND RAPID RECOVERY TO COMPLETE HEALTH AND STRENGTH. OUR COUNTRY HAS MADE SPLENDID PROGRESS AT HOME AND IN THE WORLD UNDER YOUR INSPIRED LEADERSHIP AND WE PLEDGE YOU OUR FULLEST SUPPORT IN YOUR GREAT WORK."

For the entire period since the announcement of Ike's unfortunate confinement the American people have observed keenly the conduct of the Government in general and of the President's top advisory group in particular. A true leader is appreciated most when his team is forced to carry on without him, and thus the present crisis is a major test of the administrative organization. We observe no flaws in the conduct of any of the President's advisors, and the fact that even the Administration's most critical opponents have been unable to find fault with the operation of the Government during his absence rather supports our observation.

The opposition deserves the country's recognition and gratitude for facing the situation soberly and, in a spirit of fair play, refraining from seeking political advantage from his illness. Beneficial compensation usually arise to soften the sting of misfortune. In this case the show of fine moral fibre in the vast majority of our public officials is heartening.

In the final analysis the greatest credit must go to President Eisenhower, for the work he has done to create integrity in Government is clearly bearing fruit. Members of his Administration, as well as the whole Government he heads, have proven their mettle in meeting this test.

Mutual Interests

AN item in our "News and Views" (page 99) describes the meeting of the Education Committee of the National Coal Association at one of our midwestern engineering colleges. It relates how the committee members toured the campus and discussed curricula with the faculty and administration of the Michigan College of Mining and Technology at Houghton, Mich., and concluded that the college was providing sound instruction with good equipment.

There are many mineral industries colleges located in traditional metal mining areas that are turning out well-rounded graduates qualified for employment in coal mining. Similarly, engineering students at colleges where coal technology is emphasized are generally well equipped for employment in metal mining and industrial mineral operations. Unremitting effort, of course, is needed to encourage promising young men to choose careers in all branches of the mining and quarrying industry. MINING CONGRESS JOURNAL has long pointed out that the interests and technology of the coal and "hard-rock" mining industries have much in common and we view this meeting of coal mining representatives with midwestern educators with hearty approval.

By the very nature of mining, the average miner tends to become enveloped in the activities of his own corporation, district, mine, sometimes even his own working area in the mine, for a large portion of his lifetime, often to the exclusion of other more broadening interests. Metal miners grow to think in terms of metals, coal miners in terms of coal, industrial mineral producers in terms of their own products—so it is far too easy for the groups to drift apart. Meetings which draw together leaders from different fields are necessary to advance our common goals, and should produce much of mutual benefit.



Steel supported slushing drift

Yieldable Steel Arches For Roof Support

A Roof Support for Heavy Ground which Permits Rock to Relax into a Natural Pressure Arch

By **R. W. SLEEMAN**

Chief Mining Engineer
Bethlehem Cornwall Corp.

THE concept of a yieldable support began in Europe in the early 1900's because of the deep mines having heavy roof pressures. The first yieldable arches consisted of arched steel caps set on wood or wood and stone pack walls which would yield, but often not enough to allow the formation of the natural pressure arch. Although successful, these arches were expensive and difficult to install. In the early 1930's, the use of steel arches with yielding joints was started and developed into the yielding arch of today. Many shapes and sections were tried for these arches. At first, the standard structural shapes were used with varying flange and web thicknesses, but the design of the yielding

joint proved faulty and difficult. The idea of using a channel shape proved more practical and finally developed into a "U"-shaped section with heavy flanges. This section has great stability due to its conical shape and two similar moments of inertia which affords great resistance to buckling and torsional stresses.

In underground mines, rock formations are under great latent stresses which are released by mining, causing rock pressures. As these pressures become dynamic, the rocks around the opening begin to relax and finally break and flow toward the openings. The yieldable arch is designed to resist and restrain the relaxation of the rocks. It restrains the latent forces

and induces the rocks around the opening to form a natural pressure arch. In heavy ground where rock pressures are predominantly vertical, a three-piece arch should be used; however, if a drift or tunnel is subjected to pressures from many directions, a four-piece circular set should



These arches have yielded about six in.

be used. In other words, the yielding joint should be parallel to the directions of the rock pressure, if practical.

15-Inch Overlap

The arch segments as fabricated by Bethlehem Steel Company are made of a rolled, nestable, "U"-shaped section four in. deep, five in. wide and weighing 15 lb per ft. The overlapping sections are fastened together with two 1-in. "U" bolts and heavy clamp bars, and the resistance to yielding can be regulated to suit conditions. Each yielding joint consists of 15 in. of overlapped section. The "U" bolts at the yielding joints are tightened to 200-220 ft lb of torque by using impact wrenches and checking with a torque wrench. It then requires approximately 60,000 lb of force parallel to the joint to make the joint yield. Inspection of the joints is necessary when the steel arches begin to receive pressures, to make sure that each joint yields before distortion of the arch occurs. If a joint binds, the clamps can be tapped with a hammer or loosened slightly to induce slippage.

In all drifts, whether horizontal or inclined, the arches are placed normal to the bottom and spaced at two-ft to five-ft intervals according to conditions. The individual arches are fastened together horizontally with either channels or angles attached with "J" bolt clamps. When the bottom of the drift is hard, the legs of the sets can be placed on the rock. If the bottom is soft, however, heavy steel plates or light steel plates on hardwood blocks can be placed under the legs. The drift should be driven as near the size of the yieldable arches as practical so as to use a minimum amount of blocking. The arches should be lagged and packed as solidly as possible to distribute the forces equally. Lagging can consist of round poles, sawed plank, or rolled steel sections, but should be unattached so it is free to move when yielding occurs.

Concrete Fails at Depth

After 1946 rock pressures in the Cornwall, Pa., magnetite mines were controlled very successfully with concrete. However, in recent years, as mining depths have increased, concreted drifts in various sections of the mine have failed due to excessive pressures.

The No. 4 Mine is one of two underground mines located at Cornwall. The ore body is serviced by two inclined shafts sunk on catenary curves, located in the footwall about 100 ft below the contact, and closely following the dip of the ore body. The slope at the collar is 36°, flattening to 26° at the bottom. Since the ore is structurally very weak and caves readily, it is being mined by a panel caving method, a modification of block caving. Current mining is taking place between the 700 Level and the 945



A concreted slushing drift beginning to fail



Steel arches yield without deformation where concrete and timber fail



Fast and easy installation

Level. The ore body came to within 150 ft of the surface and extends to a vertical depth of 1200 ft. A cross-cut is driven from the shaft at 60-ft vertical intervals to the predetermined location of the haulage drift. The haulage drift is driven parallel to the strike in the trap rock footwall to the extremities of the ore body, always keeping 25 to 30 ft below the contact. The drift is supported before any further development is started because the trap rock is blocky and highly fractured. Slushing drifts on 40-ft centers are driven above and normal to the haulage drift, parallel to the contact, maintaining as closely as possible an average distance of 35 ft between the footwall contact and the floor of the drift. Slushing drifts are about 150 ft long and break into the haulage drift level above. The slushing drift is supported after it is completely driven. Finger raises on 20-ft centers on both sides of the slushing drift are driven through the footwall to the contact for an average height of 35 ft. The raises, which are driven 10 ft from the center line of the slushing drift are enlarged to bells undercutting an area 20 ft in diameter. Undercutting proceeds, between haulage levels, across the entire ore body, beginning at the eastern extremity. The ore is drawn, scraped, loaded, trammed and hoisted in the normal manner.

Costs Compared

As pointed out previously, in recent years, as mining depth has increased, the concrete lining in about 10 percent of the slushing drifts and all haulage drifts has failed due to rock pressures. When a concreted drift is subject to excessive pressures, a series of cracks develop more or less parallel to the drift. Once the concrete has

TABLE I	
Concrete costs per lineal ft of drift	\$31.35
Roof bolting cost per lineal ft of drift	3.00
Repairing and resupporting cost per lineal ft of drift	33.76
TOTAL	\$68.11

TABLE II	
Labor 93 man-shifts @ \$16.96	\$1,577.28
Steel arches 73 arches @ \$65.91 each	4,811.43
Wood blocking 19,355 bd ft @ \$63/1000 bd ft	1,219.37
TOTAL COST	\$7,608.08
Total Cost Per Lineal Ft of Haulage Drift	\$30.93

TABLE III	
Initial concreting @ \$34.14/lineal ft	\$5,121.00
Roof bolting 100 ft of drift @ \$3.70/lineal ft	370.00
Repairing the upper end	919.60
TOTAL COST	\$6,410.60
Total Cost/Lineal Ft of Drift	\$42.74

TABLE IV	
Yieldable mine arches	
Labor 266 man-shifts @ \$16.96	\$3,832.96
Steel arches 134 arches @ \$57.61	7,719.74
Wood blocking 21,027 bd ft @ \$63/1000 bd ft	1,324.70
Wood mine ties 248 @ \$1.30 each	322.40
Finger Sets	
Labor 115 man-shifts @ \$16.96	1,950.40
Timber 5,564 bd ft @ \$78/1000 bd ft	433.99
TOTAL COST	\$15,584.19
Total Cost Per Lineal Ft of Slushing Drift	\$34.92

cracked it has lost its strength. It then becomes necessary to install roof bolts to keep the concrete in place, at least temporarily.

After mining has been completed on a level, the haulage drift is kept open

for ventilation and manways from slushing drifts driven from the level below. As mining progresses on the lower level, the upper haulage drift is subjected to great pressure and must be resupported with either timber, six-in. pipe or another inner lining of concrete. The total cost of supporting a haulage drift with concrete and repairing for a life of about nine years is shown in Table I.

Yieldable mine arches were installed in our 945 Level haulage drift in August 1954. They are three-piece arches 8 ft-1 in. wide and 8 ft-10 in. high, spaced on four-ft centers. The total weight per arch, including five struts each, is 539 lb and the cost \$65.91 complete. The heaviest section weighs 135 lb. Blocking consists of two-in. second grade oak planks. The total cost of supporting 246 ft of haulage drift with yieldable mine arches is shown in Table II.

This section of haulage drift had been driven for a concrete lining which requires more room than yieldable arches with the same inside clearances, so our blocking costs are abnormally high. Since the life of a haulage drift is about nine years, we feel that in the future a treated blocking should be used. This would add about \$1.40/lineal ft of drift to the cost of future installations.



A finger opening in a slushing drift supported with yieldable steel arches

Roof Bolts with Concrete

As the slushing drifts are undercut and subjected to weight, they develop a series of cracks, similar to those in the haulage drifts, which require supporting by roof bolts. However, in most slushing drifts, after the drawing of the ore commences, weights are relieved and little additional cracking occurs; but with the frequent secondary blasting in the bells, roof bolting is necessary to prevent the cracked concrete from slabbing off. In many cases the upper end of the slushing drift beyond the last set of draw points must be resupported at least once. The total cost of supporting a slushing drift 150 ft in length with concrete plus repairs for a life of about two years is shown in Table III.

Yieldable mine arches were installed in three slushing drifts beginning February 1955. They are three-piece arches 6 ft-4 in. wide and 7 ft-3½ in. high, spaced on three-ft centers. The total weight per arch, including five struts each, is 461 lb and the cost \$57.61 complete. To protect the steel



Blocking yieldable steel arches in a slushing drift

arches at the draw points from abuse when drawing ore it was necessary to install a timber set in the finger opening behind the yieldable steel arches. The total cost of supporting 446 ft of slushing drift with yieldable mine arches is shown in Table IV.

Sets Are Re-usable

The above costs do not take into account the recovery value of the yieldable arches. If the 134 steel arches can be recovered in 20 man-shifts and re-used once the total cost per lineal ft of slushing drift would be \$27.05 and if re-used twice, \$24.92.

Since the life of a haulage drift is

nine years and a slushing drift two years, definite data as to performance and recovery cannot be ascertained for quite some time. In order to get performance data sooner, yieldable arches were installed in the upper ends of slushing drifts where the concrete was failing. The arches yielded from 4 in. to 6 in. without any signs of deformation while the adjoining concrete and timber failed. To date, the arches from the upper end of one slushing drift were recovered without any trouble and will be reused. This seemed to be definite proof that the yieldable arch could do the job and has a great future in underground mines where heavy ground is encountered.

Advantages of Yieldable Arch Installations

1. Reduce maintenance.
2. Long life.
3. Easy and fast installation.
4. High recovery.
5. Utilize the advantage of driving an arched drift.
6. Pipes, trolleys and cables can be readily fastened to the steel.
7. Easily stored and transported.
8. Adjustable in height by varying the amount of overlap at the yielding joint.
9. No equipment needed for installation except torque wrench and impact wrench.
10. Can be installed while drifting is in progress. With concrete this is cumbersome.
11. Adaptable to forepoling.

Disadvantages

1. Present a fire problem if lagged with wood. However, some wood preservatives provide a certain degree of fire resistance.
2. In slushing drifts, the scraper may catch the steel. However, a lining of planks or steel scraper guides can be installed.
3. Resistance to ventilating currents is higher than with concrete.
4. If drifts are to have a long life they require treated lagging.
5. Higher initial cost per set than timber.



Overall view of No. 4 mine at Cornwall



More powerful equipment and higher speeds result in greater heat at the point of contact with the coal face

Frictional Ignition Of Gases By Mining Machines*

Increased Mechanization Brings With It the Danger of
More Methane Ignitions

By IRVING HARTMAN
U. S. Bureau of Mines

SEVERAL recent ignitions of fire-damp in American coal mines have been attributed to frictional heating when hard rocks were struck while cutting and drilling coal seams. Although none of these ignitions caused severe explosions, they call attention to a problem that can become increasingly significant as mechanized mining is further developed. Powerful high speed machinery has increased the rates of advance into virgin coal, but has created many problems. Unforeseen faults and hard mineral inclusions may be encountered; coal brought down in this way is finer in size; more gas is released from the seam; it is frequently more difficult to provide adequate ventilation at the face; and new roof-support problems must be solved. In particular, continuous mining machines greatly increase the frequency of contact between cutter bits and minerals. In view of these conditions, it may be expected that more gas ignitions will occur as a result of frictional heating unless the situation is

understood and remedial measures are introduced.

Heat Comes from Friction and Impact

Heat is produced whenever energy is utilized to perform work or when one form of energy is converted to another form. In general much heat is evolved by the friction and impact of objects.

In mining coal, large forces are applied and much energy is expended. Many machines depend on friction for their effectiveness, and various materials, including rocks and metals, come into frictional and impact contact, frequently in the presence of an explosive atmosphere. Accordingly, the problem of heating and the possibility of igni-

tions must be considered in the design, construction, and use of mining machines. To produce an ignition the amount of mechanical energy converted to heat need not be large, but heat must be liberated rapidly and within a small volume.

In general, flammable mixtures of gas are ignited by frictional heating in two ways: (1) A small volume of gas is heated to the ignition temperature by direct contact with a hot part of one of the rubbing surfaces; (2) small heated particles, commonly termed frictional sparks, are projected into the gas mixture. These frictional sparks are small, hot particles of solid matter torn from one of the larger pieces in contact. The particles may be inert, in which case their temperature is limited by their melting point, or they may be chemically active, in which case their temperature is augmented by oxidation. The existence of frictional sparks should be considered as a warning in coal mines where a flammable atmosphere exists, but

* Extracted from Bureau of Mines Circular 7727.

they do not necessarily mean that an ignition or explosion will occur. To ignite the gas, the sparks must have a high temperature and their heat content must be sufficient to impart the necessary amount of heat to a small volume of the gas mixture. The ability of sparks to ignite firedamp is greatly restricted by the short period of contact with the gas, owing to cooling by convection, and to the "ignition lag" period of the gas, which varies with composition and with temperature. All these factors make flying sparks generally less dangerous than sparks whose paths are obstructed by a thermal insulator at an early stage.

Ignition Sources

In many mining operations the heat produced by friction and impact is high enough to ignite firedamp or coal dust under certain conditions. In Great Britain, where most firedamp ignitions of this nature have been reported, the great majority occurred while cutting coal seams with machines; this was also an important cause of ignitions in other countries. Other causes of frictional ignitions were drilling in the seam; hand picks used for testing the soundness of roof strata, breaking rocks, and testing and cleaning faults; hand shovels striking roof rocks; sledge hammers and other tools striking rocks; continuous mining machines cutting hard rock inclusions in coal seams; sliding and impact of rocks on other rocks during roof falls and roof caving; steel chocks and props being forced during withdrawal of roof supports; derailing and wreckage of runaway trips of mine cars; projection of detonator fragments from shot holes during blasting; fan blades rubbing against fan casings; and operation of conveyor belts and belt slippage. Heat and sometimes strong sparks have been observed when rock is projected by pneumatic stowers and while loading mine cars, sliding metal roof props in chutes, and tightening roof bolts.

The surfaces whose friction or impact has resulted in dangerous heating or sparking include: rocks against rocks, metals (especially steel) against rocks, steel against steel, light metals against steel. The mine rock most likely to create a hazard is siliceous or quartz-bearing sandstone, with iron pyrite next. A few ignitions have been reported when hard shales and ironstone (stratified siderite) were struck by steel.

Experience in the U. S.

In coal mines in this country frictional sparking, and ignitions of small volumes of gas have been observed on numerous occasions while cutting and drilling seams, while tightening roof bolts, and during other mining operations. These ignitions generally have not been considered important enough

to form the subject of published reports. During the past two years the Bureau of Mines investigated seven ignitions of this character. A brief account of these incidents follows.

In April 1953 two men were burned when the cutting bits of a continuous mining machine contacted the sandstone roof, igniting methane from a fender in the face of a crosscut. This machine applies a slow boring action to the coal face through two horizontal rows of rotating arms, which are staggered to cut intersecting circles in vertical planes, operating in a manner similar to a group of large core drills. When the machine first attacks a coal face the air can be made to circulate around the bits; however, as the machine head advances into the coal it occupies nearly the entire cross section of the bore, so that air flow is obstructed. About an hour before the ignition, the machine had advanced

undercut. The machine had just completed a cut 12 ft wide and 8 ft deep when it was stopped to make a test for gas. No gas was detected and cutting had been resumed when the ignition occurred. No one was injured, and the flame was quickly extinguished with rock dust. Ventilation was normal, with about 4000 cfm of air passing the face.

In May 1954, two gas explosions were initiated at a mine two days apart when bits of continuous mining machines encountered pyritic inclusions in the band of rock immediately above the coal bed. The machines were of the boring type. Four men were burned in the first explosion and one man in the second. The practice in this mine was to advance the machine about 25 ft into solid coal, then to pull back and widen the entry to the desired size. The coal seam is gassy, and the manner in which the machine



Continuous mining brings with it a faster rate of penetration and the need to concentrate on ventilating the face adequately

approximately 90 ft into the dead-end face of the entry. On examining the place an estimated 1.5 percent gas was found near the face. The machine was moved back 35 ft to drive a crosscut to an adjoining work-out room after the gas had been removed. The crosscut was begun after a deflecting curtain was erected to within three to four ft of the rib immediately in by the machine to carry air to the machine. The crosscut was 9½ ft wide—the width of the machine—and had been driven to a depth of 20 ft when the machine was stopped to permit change of shuttle cars. Normally this takes three to five minutes, and a test for gas is made during this time. However, on this occasion no test was made. Soon after the cutter head was started again gas was ignited. Ventilation in the cut was not adequate.

In January 1954, gas was ignited by a shortwall cutting machine when the bits struck hard sandstone in an

was designed and used, coupled with faulty installation of the brattice cloth, prevented adequate ventilation of the cut. Water sprays were being employed to allay the dust. Following these explosions a study was made to determine what changes in mining practice are advisable to prevent similar ignitions. It was recommended that advance of the machine into the solid should not exceed eight ft, unless ventilation at the immediate face can be greatly improved. Further it was recommended that the end of the line brattice is kept close to the face; that doors, check curtains, and other ventilation facilities should be properly installed and maintained; and that mining operations be discontinued and power cut off from face equipment when the methane content of the air near the machine exceeds one percent. Several of these measures were adopted, and during the past year no further ignitions occurred at the mine.

The Bureau investigator also suggested that with continuous mining machines, normal mine ventilation should not be depended upon solely. Auxiliary mechanical means should be provided to supply an ample volume of air to be discharged at high velocity from one or more openings through the head of the machine against the face.

In July 1954, gas was ignited while completing a shear cut when the chain bits of the machine encountered pyritic lenses in the floor; the inby end of the shear cut was found to have penetrated about eight in. into the bottom. Gas was thought to have entered the cut from a fault that was uncovered after the coal was removed. Cutting into the fault had been expected and gas in abnormal quantities was encountered in the adjoining entries while driving into the fault zone. However, no tests for gas were made before starting the shear cut in question.



Experiments with water sprays and compressed air have been successful in reducing the gas and dust concentrations in the kerf as it is being cut

In January 1955, an ignition of gas occurred shortly after beginning to drill a hole in drawslate above the coal seam at a place where a shelter hole was to be prepared. The ignition was attributed to friction of the drill bits with the rock. Neither pyrites nor quartz-bearing sandstone were reported in the drawslate. The drill was equipped with a water spray, but it is not certain whether this was in use. Shortly before drilling into the slate, the seam had been undercut and a hole drilled into the coal eight in. below the drawslate. A test made for gas just before drilling began in the drawslate gave negative results.

In March 1955, gas was ignited while completing a shear cut when the cutting bits of the machine encountered a streak of iron pyrites "or some other hard material" near the floor. Water was being sprayed on the cutter bar to allay dust, and the ven-

tilation at the face was said to be quite adequate at the time of ignition. The report of this incident indicates that the cutting bits had carbide tips. Similarly, the report of the previous ignition while drilling drawslate calls attention to the fact that tungsten carbide bits were used in the high-speed drills. These reports and oral accounts of observed sparking in other mines indicate that hardness of the contacting metal is important. In high-speed machine operations this may be a factor in frictional ignitions, although it is contrary to findings in British and German experiments.

Experiments in Britain

In a recent investigation conducted in two seams of a British coal mine, firedamp was diluted in the cut with compressed air and water sprays during overcutting. The experiment was made in dry and dusty seams. Two sets of sprays were used, one to spray

ing to reports from different collieries, similar percentages of methane have been encountered in cuts in other seams. The sprays are reported to fulfill the following important functions, which reduce the ignition hazard: (1) The methane content in the cut is reduced below the explosive range; (2) cuttings are thoroughly wetted, suppressing coal dust and reducing the explosion hazard; and (3) the cooling effect of the jets reduces the temperature of frictional sparks that may be produced during cutting. The tests indicate that after an extended period of idleness the sprays should be used to remove firedamp from the cut before the machine is put into action. During short periods of inactivity, even if it is necessary to stop the water sprays, a large volume of compressed air should be directed into the cut to prevent accumulation of firedamp which might be emitted suddenly.

Factors Affecting Ignition Hazard

The hazard of gas ignition by friction and impact depends on the nature of the contacting materials, the composition of the explosive gas, the available energy and the type of contact. Research indicates that ignitions are produced most easily by friction between certain types of rocks. However, most mine explosions initiated by friction have resulted from contact between rocks and metals, as during undercutting of coal seams. Metal-to-metal contacts generally produce less incandescent sparks than metal-to-rock contacts, but under some conditions, friction between light metal alloys and steel produces highly incandescent sparks.

In all types of frictional heating the ignition probability depends on the rate of energy release, which is determined by the mass and speed of the contacting objects and the frequency of contact, the concentration of heat near the point of contact, the orientation of the surface at the time of contact, and the methane and oxygen content of the atmosphere. Weak mixtures of methane below the stoichiometric limit are more readily ignited by friction than rich mixtures, and turbulence appears to increase the ease of ignition. In contact between metals and rocks, frictional impact at small angles produced the most incandescent heating; in contact between light alloys and steel, angles of 35 to 55° were most hazardous; and in some metal-to-metal contacts sliding friction was worse. Normal or direct impact rarely produced firedamp ignitions.

Of the rocks encountered in coal mines, siliceous or quartz-bearing sandstones present the greatest frictional ignition hazard; they are closely followed by iron pyrites. Some micaceous sandstones also have been found to constitute a hazard. Shales

(Continued on page 100)



Colorado Plateau activities keep all uranium milling facilities working to capacity

History and Trends of the Uranium Plant Flowsheet

Extraction of Uranium Dating Back to 1900 Is Traced Through All Its Stages to the Most Modern Present Day Plants

By **A. Q. LUNDQUIST** and **J. L. LAKE**
 General Superintendent Chief Metallurgist
 Union Carbide Nuclear Co.

THE first recorded operations in the milling of uranium-bearing ores in the United States were started in 1900 near Slick Rock, Colo. Since this period about 25 mills have been built and operated for recovery of radium, vanadium, or uranium from carnotite ores. During the past 55 years, the major efforts of the milling activities on Plateau ores have fallen into three phases; initially, the interest was in the recovery of radium, with uranium and vanadium as by-products or residues; then, as a result of a sharp decline in radium prices around 1921, the area became dormant until vanadium brought new life to the Plateau in the late twenties; and, finally, of course, the recent activity which has been stimulated by the demand for uranium.

During World War II years, the demand for vanadium from domestic production was spearheaded by the Metals Reserve Co., and uranium was produced from stockpiled tailings

under the program sponsored by the Army Corps of Engineers of the Manhattan Project. The Metals Reserve Co. derived the vanadium production from Uravan, Monticello, Durango, and Rifle plants; while the Manhattan Project built tailings treatment plants at Uravan and Durango and a concentrate processing plant at Grand Junction for refining the concentrates produced on the Plateau. Between 1945 and 1948, another slump occurred; during this time, the only plants operating were Naturita and Rifle, and these were on a part scale basis. In 1948, the Atomic Energy Commission was formed to develop a program for the production of uranium from domestic sources to supplement foreign production.

Early Operations

In order to follow the trends of uranium milling, it is best to review the older operations of the associated elements because a uranium recovery

step was often included in older plants that were built primarily for radium or vanadium recovery. Also, the plants often included vanadium recovery steps similar to present practice in some uranium mills. This discussion will be limited to the treatment of the sedimentary type ores found on the Colorado Plateau, since past production of other domestic uranium-bearing ores, such as pitchblende or uraninite types, has been small and little information is available on the methods of treatment. The few ores or concentrates of the primary type have generally been treated in specialized chemical plants where the process is varied for each particular lot of material on hand. In some cases, these concentrates were shipped abroad and treated in European plants.

In order to show adequately the trends of the uranium processing industry, it is best to follow the chronological order of operating mills, particularly noting the earlier plants in which present processing steps were introduced to the industry. Most of the older plants have been adequately described in the literature and a number of these with duplicate processes will only be mentioned in passing. Greater detail is given to the operations of North Continent Mines and of Union Carbide and Carbon Corp., which have not been covered in earlier reports.

The first milling operation on Colorado Plateau ores was started in 1900 by two Frenchmen named Poulot and Voilleque. These are the same men who sent ore specimens to France in 1899 and announcements were made in French journals about the existence of a new mineral which they named carnotite. They carried out their first experimental operations at the Cashin Copper mine in the Paradox Valley on a pilot scale, and later built a small mill in the Slick Rock District using the Engle process. A general flowsheet of this historical mill is shown in Figure 1. The ore was treated at elevated temperatures with a soda ash solution to extract both uranium and vanadium. The uranium was precipitated as an impure sodium diuranate salt and the remaining vanadium was then precipitated as calcium vanadate. This flowsheet was very simple and allowed the use of common materials of construction since acid was avoided throughout the process. The disadvantage of this process was the poor separation between the uranium and vanadium and the low vanadium extraction. The concentrates required further refining. It is interesting to note that this plant did not recover radium, and the first interest was in the uranium and vanadium content of the ore. About 15,000 lb of uranium-vanadium concentrates were produced in this plant before operations were transferred to the Western Refining Co. in 1903, and to the Dolores Refining Co. in 1904.

The operations were purchased by the American Rare Metals Co. in 1912, and the process changed to the first known acid leach plant on the Plateau. A flowsheet of this plant is shown in Figure 2. The uranium and some vanadium values were leached from the ore with sulphuric acid which had to be hauled over rugged wagon trails from Dolores, Colo. Following this leach and a clarification step, the filtrate was partially neutralized with limestone to precipitate a waste calcium sulphate product. The soluble uranium and vanadium values were then co-precipitated by further limestone neutralization. This process also gave impure products which required retreatment at other locations. Also a radium slime concentrate was recovered by classification of the solids following this sulphuric acid leach step. This general method of recovering a crude radium concentrate was used in most plants that treated carnotite ores in the early days and became the standard initial step for radium concentration. In the procedure, radium is precipitated as insoluble radium barium sulphate which concentrates in the slime fraction.

The second mill built for treatment of carnotite ores on the Plateau was operated by the Standard Chemical Co. at Uravan, Colo., and they produced a radium slime concentrate by a

conventional classification process. This mill began operations in 1910 and ran intermittently until 1922.

In 1910 the first salt roast plant was built by the Primos Chemical Co. at Newmire, Colo., for the treatment of vanadium-bearing roscoelite ores from the Placerville District. While this plant was not operated for the production of uranium, it is of interest since the salt roasting step has remained a major part of all the large,

modern mills that recover both uranium and vanadium values. In this step most of the vanadium minerals are converted to water soluble sodium vanadate which is then readily separated from nearly all other constituents of the ore by a simple water leach. If uranium minerals are present they are converted to acid soluble sodium diuranate. The flowsheet of the Primos plant, which was operated intermittently from 1910 to 1930, is

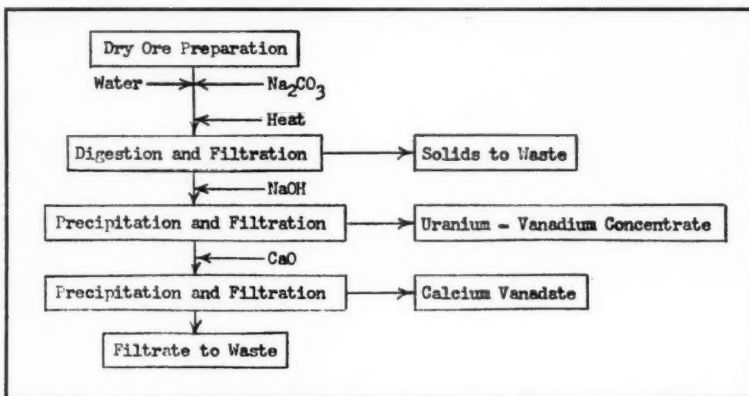


Figure 1—Poulot and Voilleque Mill

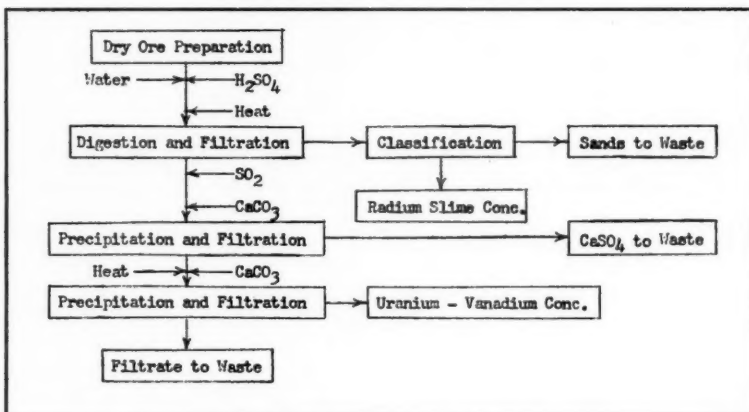


Figure 2—American Rare Metals Co.

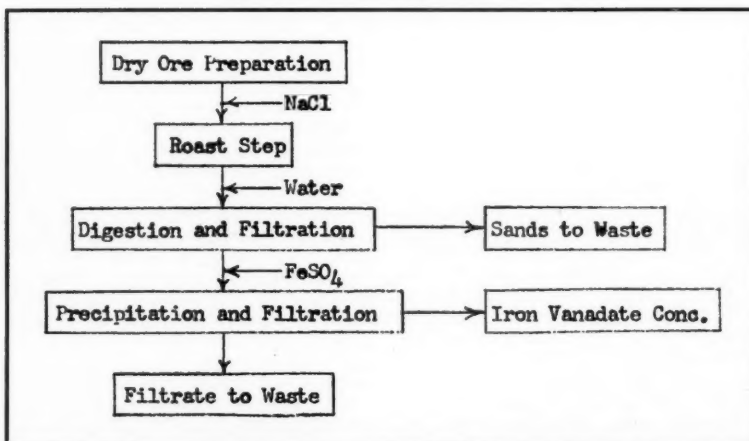


Figure 3—Primos Chemical Co.

shown in Figure 3. In this process you will note the water soluble vanadium was precipitated as a ferrous vanadate. The vanadium salt was converted to ferrovanadium in Primos, Pa.

Developments Since 1925

It is interesting that the first three plants treating Plateau ores used the two modern leach procedures for uranium recovery and the standard salt roast process for vanadium recovery. As we examine the later processing methods we find these same three steps used in a variety of combinations. The circuits increase in complexity, principally because of the refinement of wet methods for uranium-vanadium separations, more exacting specifications on product analysis, and the necessity for increased recovery of metal values.

In order to illustrate this trend to more complicated flowschemes, from about 1925 to 1940, the following detail is given on three changes of process as made by the North Continent Mines Co. at Slick Rock, Colo.

The first North Continent plant was built in 1934 and the process, as shown in Figure 4, was patterned after the operations of the Shattuck Chemical Co. in Denver. This company was treating carnotite ore on a limited scale by use of a patented "acid cure" process, which was developed by J. S. Potter, manager of the company. The North Continent Mines Co. was formed by the W. A. Baehr organization of Chicago, which also controlled the Shattuck Chemical operations.

In the first flowsheet, the ground ore was mixed with concentrated sulphuric acid and water, and the mix allowed to cure for about 24 hr in order to render soluble both the uranium and vanadium values. This step is similar to the one recently reported in use by Kerr-McGee Co. at Shiprock,

N. M. The cured mass was broken up, pulped with water, and then classified by means of a counter-current classification-wash step. The insoluble radium-bearing slimes and soluble vanadium and uranium values were removed in the overflow and the sand rake product sent to waste. The radium concentrates were recovered and washed in a filter press, then dried and shipped to the Shattuck Chemical Co. in Denver for final treatment. The acid leach liquor was evaporated in lead-lined vessels and steam-jacketed kettles to near dryness. The solid residue was then roasted in a reverberatory furnace at 1200° F for conversion of the vanadium sulphate to iron vanadate. The soluble uranium and aluminum salts in the calcines were dissolved in water and the insoluble iron vanadate separated and washed in a filter press. The iron vanadate was dried and later converted to ferrovanadium by the Alumina Exothermic process. A waste aluminum hydroxides product was then precipitated from the filtrate by pH adjustment with soda ash. Following clarification of this liquor, a low-grade uranium concentrate was precipitated with caustic soda. This product was converted to uranyl acetate or uranyl nitrate by dissolving in the corresponding acid and crystallizing the uranium salts.

The second modification of the acid cure process practiced at Slick Rock included a vanadic acid precipitation step for vanadium recovery, as shown in Figure 5. In this step, the vanadic acid was precipitated by proper pH adjustment of the boiling solution after the addition of an oxidizing agent. The vanadic acid was fused into the commercial vanadium product. The uranium-bearing filtrate was partially neutralized with soda ash to produce a basic ferric sulphate which was filtered off and discarded. The filtrate was neutralized with caustic soda

and a low-grade uranium precipitated. This product was further refined by redigesting in sodium carbonate solution and evaporating to crystallize a sodium uranyl carbonate salt.

A major change was again made in the flowsheet in 1941 by adoption of a combination salt roast, water leach, and acid leach process, as shown in Figure 6. In this combination of steps, part of the vanadium was extracted in the water leach circuit, while additional vanadium and all of the uranium was recovered in the acid leach circuit. The two liquors obtained were clarified and combined to produce a vanadic acid salt after oxidation and hydrolysis. The red cake was fused for shipment. The uranium-bearing filtrate was treated with soda ash for precipitation of a waste alumina cake, and the uranium was recovered by precipitation from the filtrate with the addition of caustic soda.

Reasons for Method Changes

This summary of the three main flowsheets of the North Continent operation is a typical example of the modifications made in the uranium-vanadium recovery plants operated in recent years. While these examples show the major changes of flowsheet, an additional number of minor revisions were also made, generally in order to gain some advantage in the economics of the process.

At this time it is noteworthy to point out that one of the main characteristics of the Plateau mills has been the constantly changing methods of the processing. Some of the main reasons for these revisions are as follows:

- (1) Varying demand over the years for vanadium, uranium and radium values.
- (2) Tightening of specifications on final products.

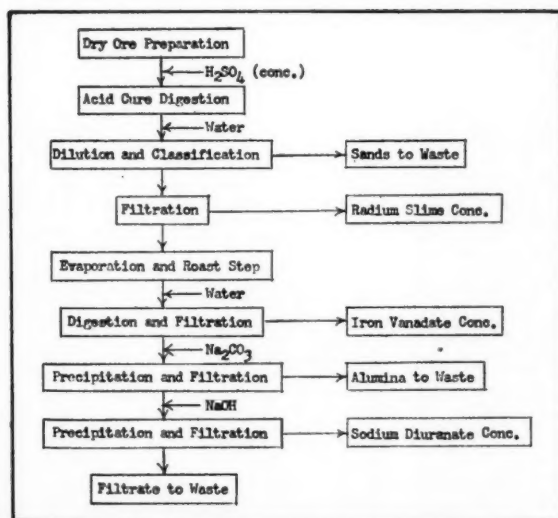


Figure 4—North Continent Mines Co. (Circuit 1)

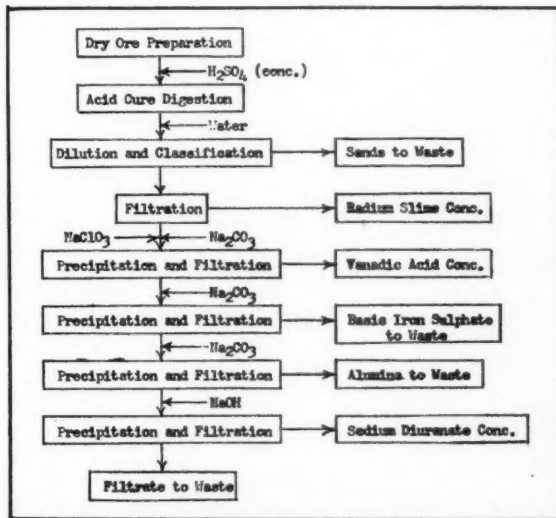


Figure 5—North Continent Mines Co. (Circuit 2)

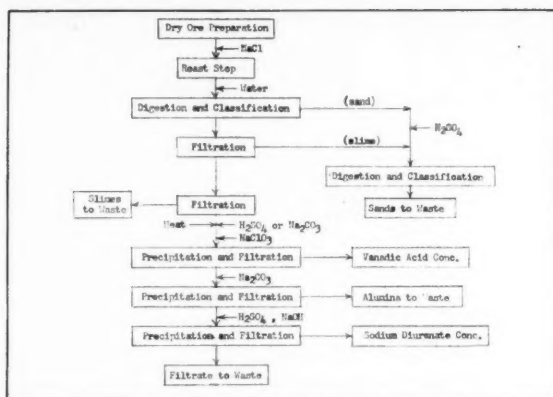


Figure 6—North Continent Mines Co. (Circuit 3)

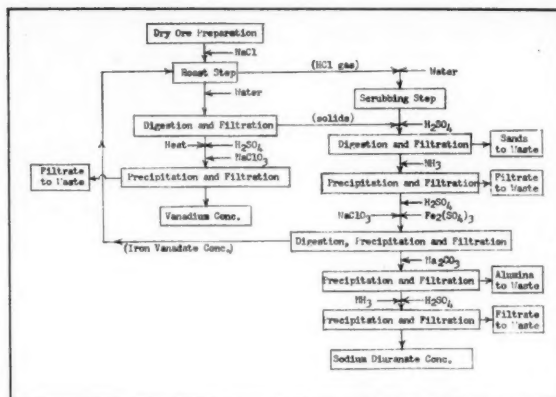


Figure 7—Rifle Plant, Union Carbide Nuclear Co.

(3) Normal quest for improved recovery and lower costs.

(4) Constant improvement of processing equipment and introduction of new items, particularly of corrosion-resistant design.

(5) Unusually large number of chemical steps that are available for use in extracting or separating the metal values.

(6) Widely varying character of ore finds throughout the Plateau.

In 1924 a second plant utilizing the salt roast process was built at Rifle by United States Vanadium Co. for treatment of the roscoelite-type ores from the Rifle Creek mine. This plant started on a flowsheet similar to the Primos Chemical Co., except that the vanadium was precipitated from the water leach solutions with sulphuric acid to produce a sodium hexavanadate—vanadic acid combination. This plant was closed down in 1932 when the supply of vanadium ore appeared to be exhausted. Other salt roast plants built during this period included the International Vanadium Corp. plant in Dry Valley, Utah; the Vanadium Corp. of America plant at Naturita, Colo.; and United States Vanadium Company's plant at Uravan. All of these plants produced vanadium from local carnotite or roscoelite ores.

In 1939, United States Vanadium Co. added an acid leach step for the extraction of uranium and additional vanadium from the regular salt roast-tailings. This circuit was operated until 1944 at the main Uravan plant.

World War II Developments

At the outbreak of World War II, the Metals Reserve Co. entered the vanadium field with an active ore purchase program. In connection with their program, two new salt roast vanadium plants were constructed. One plant was built and operated by VCA at Monticello, Utah, and the other by USV at Durango. These plants were maintained in continuous operation by the respective companies until 1946.

In early 1942, the Army Corps of Engineers entered the uranium field on the Colorado Plateau and financed the construction of a uranium refinery and two new acid leach plants for treatment of vanadium salt roast tailings. These plants were patterned after the acid leach operation at Uravan and were designed and operated by United States Vanadium Co. The leach plants were built at Durango and Uravan, and the refinery at Grand Junction.

The concentrates produced in the tailings treatment plants were shipped

for further treatment to the refinery, where a low-grade uranium concentrate and a commercial-grade fused vanadium oxide were produced. The flowsheet for the above tailings treatment is shown in Figure 8.

The metal values were extracted from the tailings in a mild sulphuric acid leach and the liquor then recovered by batch filtration and washing in a percolation tank. The vanadium was reduced by the addition of scrap iron and precipitated with soda ash or caustic soda, producing a "green sludge" which was filtered, dried, and

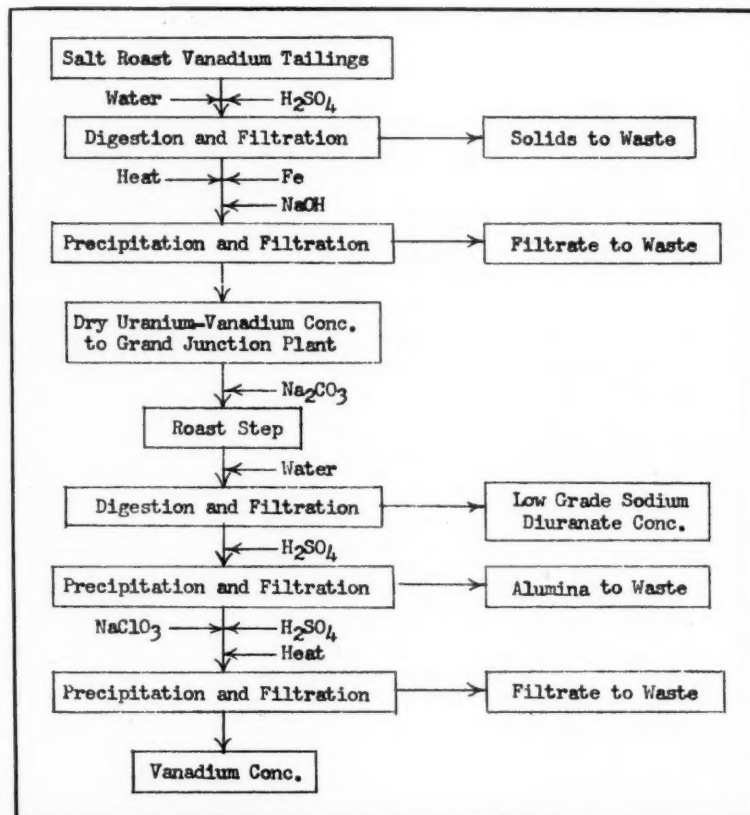


Figure 8—Tailings Treatment Plant, Manhattan Project

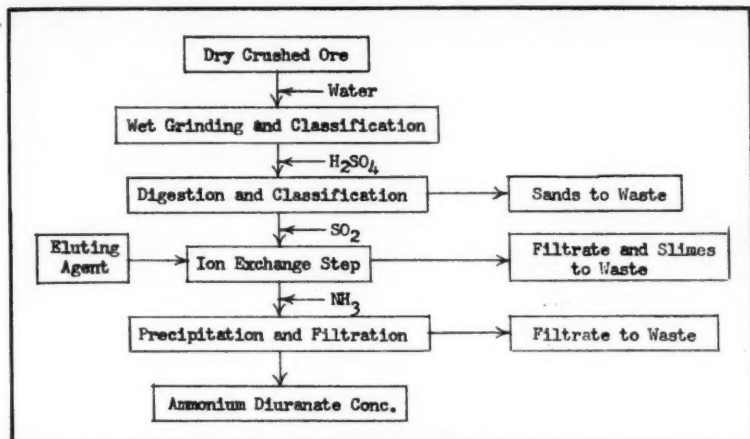


Figure 9—Modern Mild Acid Leach Circuit

packed for shipment to Grand Junction. There, in the refinery, the dried sludge was first mixed with soda ash and roasted in a skinner multiple hearth furnace at 750°C for conversion of the vanadium compounds to soluble sodium vanadate. The calcines were leached with water for extraction of the vanadium and the values recovered by precipitation as sodium hexavanadate following an alumina precipitation step. The uranium remained in the water leach residue and this product was dried and packed for shipment east for re-treatment.

Two other mills—one operated by the Blanding Mines Co. of Blanding, Utah, and the other by the Gateway Alloys Co. of Gateway, Colo.—produced vanadium for the war effort in the early forties; and their vanadium tailings were treated in the Manhattan Engineering Project plants. The Rifle salt roast plant was also reactivated for vanadium recovery.

During this period, Vanadium Corp. of America also supplied a uranium-vanadium residue for refinement at the Grand Junction plant. This product was produced by a precipitation step in which a synthetic sodium carnotite was recovered from the clarified solutions following the quench of the salt roast calcines. Sodium carbonate was added to the quench liquors for rendering soluble the uranium values.

Postwar Changes

In 1946, United States Vanadium Co. converted its Rifle plant to a uranium-vanadium recovery circuit. At that time a scrubber was installed for recovery of the hydrochloric acid generated in the salt roast operation. This acid was used for leaching the regular vanadium sand tailings for recovery of uranium and additional vanadium values. The present flow-sheet of this Union Carbide plant at Rifle is shown in Figure 7, and is typical of the salt roast-acid leach type

process in which uranium and vanadium are separated by precipitation procedures.

In the late forties, the AEC initiated a new uranium purchase program which was followed by a corresponding increase in uranium milling activity. As a result of this program, the Monticello, Durango, and Uravan plants were all reactivated, and new plants were built by Climax Uranium Co. at Grand Junction and Vitro Uranium Co. at Salt Lake City. The Monticello plant was rebuilt and operated by the Galigher Co. for the Government; the Durango plant was reactivated by VCA; and the Uravan

plant, by USV. With the exception of the Vitro plant, these new and reactivated plants included a combination salt roast and acid or alkali leach circuit in order to gain a high recovery of both the vanadium and uranium values. The Vitro plant was designed for treatment of ores with low vanadium content and, of course, omitted a vanadium circuit. Over the years, the salt roast step has remained the outstanding process for recovery of vanadium values from carnotite ores. Some of the reasons for this selection are as follows:

(1) The vanadium is converted to a water soluble salt which is readily separated by water leach from most of the other elements present in the ore.

(2) The uranium is generally converted to an acid or carbonate soluble salt which can be recovered in a mild leach circuit.

(3) The organic matter is destroyed. The presence of carbonaceous material often causes difficult problems in filtration, leaching, and precipitation steps.

(4) Most of the iron minerals are converted to ferric oxide which has a low solubility in the leach solutions.

(5) Several minor extraneous elements are converted to acid insoluble compounds and remain in the tailings.

(6) The filtration and settling rates of the water and acid leached pulps are appreciably improved in the roast step.



Sodium vanadate is shoveled from a washing tank preparatory to further treatment

GENERAL LIST OF PLANTS CONSTRUCTED FOR MILLING PLATEAU URANIUM-VANADIUM ORES

VANADIUM PLANTS

<i>Company</i>	<i>Location</i>	<i>Type of Ore</i>	<i>Approximate Period of Operations</i>	<i>Type Process Employed</i>
Primos Chemical Co.	Newmire, Colo.	Roscoelite	1910 to 1929, (intermittently)	Salt Roast
U. S. Vanadium Co.	Rifle, Colo.	Roscoelite	1924 to 1932	
Vanadium Corp. of America	Naturita, Colo.	Carnotite	1942 to 1946	Salt Roast
			1926 to 1932	Salt Roast
International Vanadium Corp.	Dry Valley, Utah	Carnotite	1938 to 1942	Salt Roast
U. S. Vanadium Co.	Uravan, Colo.	Carnotite	1931 to 1938	Salt Roast
Blanding Mines Co.	Blanding, Utah	Carnotite	1936 to 1940	Salt Roast
			1940 to 1943 (intermittently)	Salt Roast
Gateway Alloys Co.	Gateway, Colo.	Carnotite	1941 to 1943	Salt Roast
U. S. Vanadium Co.	Durango, Colo.	Carnotite	1941 to 1946	Salt Roast
URANIUM AND VANADIUM PLANTS				
Poulot & Voilleque Mill	Slick Rock, Colo.	Carnotite	1900 to 1902	Carbonate Leach
U. S. Vanadium Co.	Uravan, Colo.	Carnotite	1940 to 1945	Salt Roast-Acid Leach
			1950 to date	Salt Roast-Acid Leach
Vanadium Corp. of America	Naturita, Colo.	Carnotite	1942 to date	Salt Roast-Carbonate and Acid Leach
U. S. Vanadium Co. (Manhattan Project)	Uravan, Colo.	Salt Roast Tailings	1943 to 1946	Acid Leach
U. S. Vanadium Co. (Manhattan Project)	Durango, Colo.	Salt Roast Tailings	1943 to 1946	Acid Leach
U. S. Vanadium Co. (Manhattan Project)	Grand Junction, Colo.	Uranium-Vanadium conc.	1943 to 1946	Soda Ash Roast
Vanadium Corp. of America	Monticello, Utah	Carnotite	1943 to 1946	Salt Roast-Carbonate Leach
U. S. Vanadium Co.	Rifle, Colo.	Carnotite and Roscoelite	1946 to date	Salt Roast & Acid Leach
Galigher Co. (AEC Plant)	Monticello, Utah	Carnotite	1948 to date	Salt Roast and Carbonate Leach
Climax Uranium Co.	Grand Junction, Colo.	Carnotite	1951 to date	Salt Roast & Acid Leach
URANIUM, VANADIUM, AND RADIUM PLANTS				
American Rare Metals Co. and others	Slick Rock, Colo.	Carnotite	1902 to 1913	Acid Leach, Slime Recovery
Standard Chemical Co.	Uravan, Colo.	Carnotite	1910 to 1922	Slime Classification
North Continent Mines Co.	Slick Rock, Colo.	Carnotite	1934 to 1942	Salt Roast, Acid cure and Slime Recovery
URANIUM PLANTS				
Vitro Uranium Co.	Salt Lake City, Utah	Carbonaceous type	1951 to date	Calcine and Acid Leach
Anaconda Co.	Grants, N. M.	High Limestone	1953 to date	Carbonate Leach
Kerr-McGee Co.	Shiprock, N. M.	Carnotite	1954 to date	Acid Cure and IX
Anaconda Co.	Grants, N. M.	Carnotite	Under construction	Acid Leach and RIP
Uranium Reduction Co.	Moab, Utah	Carnotite	Under construction	Acid Leach and RIP
Mines Development Co.	Edgemont, S. D.	Carnotite	Under construction	Acid Leach and RIP
Trace Elements Co.	Maybelle, Colo.	Carnotite	Under construction	Acid Leach and RIP
Rare Metals Co.	Cameron, Ariz.	Carnotite	Under construction	Acid Leach and RIP

(The information herein given is taken from publications and other sources believed to be reliable.)

In the Uravan plant, the amenability of the ore feed to the salt roast step has been improved by the introduction of a sulphuric acid leach ahead of the roast. This process has a number of advantages over the conventional flowsheets and allows treatment of a greater variety of uranium- and vanadium-bearing ores, while maintaining high recovery of values. In addition to the primary acid leach and salt roast step, the Uravan plant also employs a secondary acid leach following the roast. In May 1955, an ion exchange circuit was added for separation of vanadium and uranium values.

Metal Values Lost

A great deal of information has been released on the newer uranium plants which have been recently placed in operation or are at present under construction, and they will only be mentioned in passing. These include the facilities of Anaconda Co. at Grants, N. M.; Kerr-McGee Uranium Division at Shiprock, N. M.; Mines Development at Edgemont, S. D.; and

the Uranium Reduction Co. at Moab, Utah. It is understood that these plants will not recover vanadium values.

The general trend, at the present time, is to waste the vanadium to tailings and recover only uranium. In most cases, this simplifies the flowsheet, but does not necessarily reduce the production cost of the uranium when the value of the vanadium in the ore is added to the price of the uranium produced. To illustrate this type of uranium mill, a hypothetical flowsheet was developed and is shown in Figure 9. The sampled ore is wet ground in closed circuit with a classifier, and the solids in the overflow are thickened and digested in sulphuric acid. The time, temperature, and other variables of digestion vary with the ore under treatment. The sand fraction is washed in a counter-current classifier circuit and the fine slime and uranium-bearing filtrate is treated in a "resin in pulp circuit." This is a continuous ion exchange step which is designed for direct recovery of uranium values from the slurry.

Flowsheets Simplified

Over the years the basic improvements in metallurgy have been in the separation steps rather than in the extraction of metal values. As compared with the overall cost of production of the finished product, the cost of treatment is such that any improvement in a specific step of the liquor treatment procedure would have very little effect on the total overall cost of operation.

The most dominant trends in uranium metallurgy are the improvements in materials handling. The simplification of flowsheet is due in part to the discarding of metal values which were previously recovered.

A general list has been compiled of most of the plants that were built and operated on the Plateau for treatment of the uranium-vanadium ores. It is given in the above table. This list shows the approximate dates of operation, types of ore treated, and the basic steps of concentration. Information in the table is taken from publications and other sources believed to be reliable.



Payday does not present the burden in clerical work that it once did

Machine Cost Accounting

**Hanna Coal Division Gets Detailed Information from Its
Operating, Maintenance and Purchasing Departments
at a Lower Cost with Machine Accounting**

By **RALPH W. HATCH**

Statistician, Hanna Coal Division
Pittsburgh Consolidation Coal Co.

HOW many times have you been asked by your boss, "How much is it going to cost us to do that job?" or "How much does it cost per ton to maintain that machine?" Many times your answer is vague and the best you can do is guess since you do not have cost records to tell you what it costs. You may be fortunate and hit it squarely, but most of the time you are at a loss.

As competition in the fuel business becomes keener, operating executives will require more cost records of their office personnel than ever before. High cost maintenance items must be pin-pointed and corrective measures taken. Gone are the days when the master mechanic could carry all of

this information in his head. Coal mining is more complex and more intricate than it was 20 years ago.

Offices Need Renovating

Great strides have been made in the development of mining machinery. Companies have invested thousands of dollars in modernizing mines. Little time has been lost in acquiring the best that could be afforded. In the mine office, however, in a good many cases coal is still being loaded by hand and hauled by mules.

Boastful claims are being made as to what new equipment will save per ton of coal mined, but before you buy the new, you must know how much the old costs to operate before you

can properly evaluate the claims. To have available good cost records is of utmost value to the modern day coal executive.

The Hanna Coal Division of Pittsburgh Consolidation Coal Co., has for many years spent considerable money in keeping good cost records. In 1949, they mechanized their offices with installation of International Business Machines for three reasons: (1) To cut clerical cost; (2) To obtain more detailed information on all various phases of operation at a lower cost; and (3) To level out peak work loads. They have been able to accomplish this goal. Today, the operating heads of the company have records available to enable them to operate efficiently. Cost data on a specific job or maintenance on a certain piece of equipment is obtained by machine at a cost far lower than what it would cost to obtain the same information manually. As the efficiency of the IBM Department increases, they continue to add additional reports and records. Not every record or report is prepared on IBM machines as there are records of some nature that can best be prepared manually due to the lack of volume. Greatest efficiency is obtained with volume.

One feature about machine accounting that is good is the fact that the

machines pace the operators instead of the operators pacing the machines, and since they operate at a high rate of speed, great volumes can be handled quickly.

How One System Works

Here is how Hanna's system works. Each day one of the machines prepares a time card for each employee and sends it to the mine. In this card in punched holes is the employee's mine number, clock number and name. The foreman then marks this card with a heavy graphite pencil. These marks are read by the machines and the information punched in the cards. The cards are returned daily to the IBM Department where all of the calculations for the man's earnings are performed mechanically. No calculation of payroll is performed manually. The cards are sorted by machine at the rate of 650 cards per

Material requisitions are entered on a card and sent to the IBM department where a perpetual inventory for each item in each warehouse is kept

minute into job classifications or account number, and a labor cost statement is prepared showing the total labor cost for the day and to date this month for each classification of labor. This statement also lists by job the total straight time and overtime hours daily. A list of all time

cards for the day is run and returned to the mine office to check and is prepared in such a fashion that the superintendent can immediately spot any overtime money paid the previous day. The machines list this information at the rate of 100 cards per minute.

At the payroll closing, the time cards are sorted by employee and a complete detailed statement of his day-by-day time and earnings is prepared, and at the same time a total gross earnings card is automatically made. The F. I. C. A. and withholding taxes are computed mechanically and punched into the employee's gross earnings card. Deduction cards are then collated with his earnings cards and a paycheck is prepared by machine with each deduction listed separately.

Supply Accounting

Supply accounting is handled in much the same manner with issue cards being prepared for each issue from the warehouse. Issue cards are sent to the IBM department which keeps a perpetual inventory for each item in each warehouse with all extensions made mechanically. These issue cards are also sorted by account number and a cost statement for supplies issued today and to date by cost account number is prepared and returned to the superintendent.

At the end of the month a stock status report is prepared for each warehouse, listing the description of the item on hand; its class and stock number; the unit of issue (feet, pounds, barrels, etc.); the quantity on order; consumption to date this year; quantity on hand; average unit price; and the dollar value. A copy of this report is sent to the Purchasing Department for each mine warehouse, and every three months a combined stock status for all warehouses is prepared for the Purchasing Department. This report shows the above-mentioned information for each item and is grouped by like items. The Purchasing Department checks this report daily as it checks the purchase requisitions from the mines and if one mine orders an item that is

Employee time cards are prepared each day by machine. Hanna uses a different type of cards for deep mines (top), strip mines (center) and the central shop (bottom)

Hanna's supply accounting has only been on IBM machines since 1952 but since that time they have reduced inventories and supplies on order more than 50 percent. Information that has been furnished the warehouse supervisor and the purchasing department have enabled that group to do a much better job of warehousing and purchasing.

As a by-product of this system the coal company is able to keep good maintenance cost records. Various types of equipment were classified and each class given a code number. Then each piece of equipment was given an equipment code number, and finally the various component parts of each type of equipment are coded. For example, on locomotives, the electrical controls, lights, cable, cable reel, wheels and axle assembly, journal boxes, lubrication system, etc. were each given a code number. Every hour of labor spent by the mechanics on a piece of equipment is recorded daily as well as supplies issued and charged to the piece of equipment. At the end of the month a report is prepared showing the labor and supplies used for the maintenance of each class of equipment. This can be broken down by each piece of equipment and each component part of the equipment by merely sorting the cards. A record is kept of the tonnage handled and a cost per ton of coal handled by the equipment is computed. If the master mechanic wants to know what the

Deduction cards are kept for each employee

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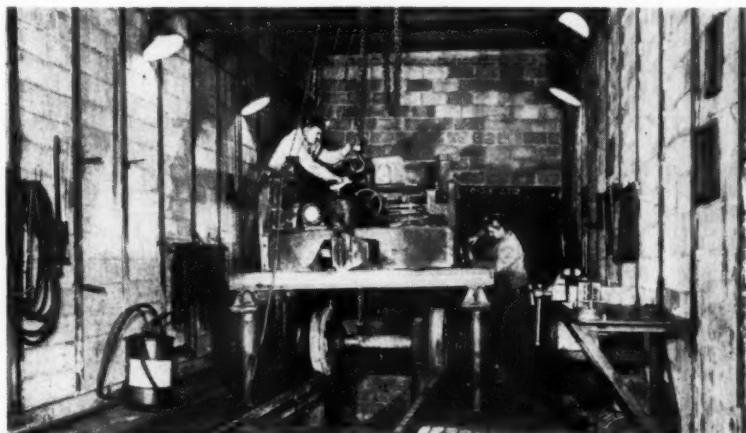
Then each shovel is broken down into several component parts as follows:

Class	Equipment No.	Description
01	001	46-A Shovel
01	002	46-B Shovel
01	003	46-C Shovel
01	004	46-D Shovel
01	005	550-B Shovel

On the IBM cards, there are also columns available to keep costs on any particular job. If the master

Part	Item
Crawlers	Pads
	Frame
	Gears
	Bushings
	Sprockets
	Rollers
Propelling and Steering	Steering Saddles
	Shafts
	Gears
	Shafts
	Bearings
	Knuckles
Dipper and Handle	Dipper Handle
	Dipper
	Dipper Teeth
	Dipper Door
	Bail
	Padlock
	Latch Bar
	Snubbers

Hanna feels that it has a good machine accounting system—one that gives our operating, maintenance and purchasing departments the detailed type of information they need to properly manage our properties—and does so at a much lower cost than what could possibly be done manually.



A by-product of Hanna's supply accounting system is a good set of maintenance cost records



Welcoming luncheon featured talks by high leaders from Government and industry

The Las Vegas Story

Record Registration at AMC Meeting as Miners Discuss Industry Problems

ON Monday morning, October 10, mining men and ladies from all over the United States gathered in Las Vegas, Nev., for the opening session of the American Mining Congress 1955 Metal Mining and Industrial Minerals Convention. Capacity crowds attended and participated in all technical, general and business meetings, to dispel all skepticism that the gayety of Las Vegas might detract from the important business at hand. By Tuesday evening more than 3000 were on hand, including neighbors from Canada, Mexico, South America, and Europe, and registration continued until late Wednesday afternoon. Final figures had not been compiled as this was written but there can be no doubt that this was the biggest Mining Congress meeting ever held in a non-exposition year.

Every one of the sessions dealing with the legislative, economic and operating problems of the industry was crowded with eager, attentive miners. As speaker after speaker unfolded the story he had to tell, it became evident that mining, one of the country's oldest and most basic industries, is also one of its most mature. High officials from local, state and national levels discussed the relationships of the in-

dustry to the Government. United States Senators and Representatives explained what is being done in the Congress to assure the continued development of the industry. They heard leading mining men review the problems involved in maintaining a strong mining industry capable of meeting any demands that circumstances may impose.

If the Convention with its broad coverage of every phase of the mining industry can be said to have had a central theme, it was a preoccupation with the establishment and strengthening of an adequate "mobilization base." Every viewpoint was aired and all possibilities thoroughly explored. An advantage of these discussions and frank exchanges of opinions on vital topics will be better understanding and full cooperation between Government and the industry. Such an understanding could result in a sound solution of the problem of supplying the minerals needed for our economy and maintaining the capacity to expand rapidly in time of another national emergency.

Technical Sessions Crowded

Overflow audiences listened attentively to papers on exploration meth-



AMC president Howard L. Young and Mrs. Young enjoy a moment's relaxation

ods and equipment, new underground and open-pit mining practices and tools, and developments in minerals beneficiation. There were nine sessions devoted to these topics as they applied to extraction and processing of metals and industrial minerals and to latest developments in the uranium industry. In the latter case many facts and figures, hitherto under close security wraps, were revealed by the various speakers.

A full account of each session is given in another part of this report.

Welcoming Luncheon

Convention delegates got a royal welcome to Las Vegas and to Nevada at the luncheon Monday. With Roy A. Hardy, chairman of the AMC Western Division presiding, mining men heard Las Vegas Mayor C. D. Baker extend a cordial invitation to

enjoy their stay in the booming city.

Governor Charles B. Russell of Nevada declared that the State was rolling out the red carpet for the Convention visitors. He said that mining was the basic industry of the State and called for policies that would continue the domestic industry on a sound footing. He particularly emphasized the need for a return to a solid monetary system which would recognize a fair price for gold and silver. The State's Lieutenant Governor Rex Bell echoed the welcome of the Governor and, citing the history of mining in Nevada, said that a resurgence of the early mining boom is now in process. He expressed the hope for a continuance of a healthy mining industry and declared that officials of Nevada will continue to battle for its welfare.

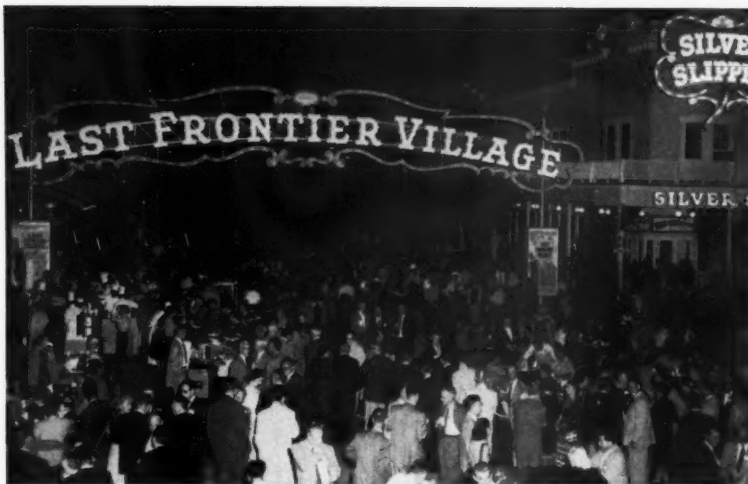
Officials of the American Mining Congress, including President Howard I. Young, Program Chairman L. J. Randall, Manufacturers Division Chairman J. W. Overstreet, and Coal Division Chairman L. C. Campbell, expressed appreciation to the Nevada officials for their warm welcome. They also commended the fine program arranged for the meeting and praised the work of the American Mining Congress on behalf of the entire mining industry.

Mr. Hardy complimented the many committee members who had worked so hard to develop the program and arrangements for the Convention.

The luncheon was concluded with the introduction of distinguished members of Congress, high Government officials, and representatives of foreign nations who were on hand to participate in the Convention activities.

Strategic Minerals Luncheon

A capacity crowd attended the Strategic Minerals Luncheon on Tuesday, October 11. Sam H. Williston, chairman of the AMC Strategic Minerals Committee, introduced Rep. Clair Engle (Dem., Calif.), chairman of the House Interior and Insular Affairs Committee who made a stirring ad-



The Barbecue was a gala affair

dress, setting forth his ideas as to the course to be pursued by the mining industry in the year ahead.

Engle said that the history of both World Wars and of the Korean episode followed the same pattern with respect to mineral development. He stated that in all three of these situations the United States frantically sought strategic minerals and metals with which to fight the wars. He pointed out that the Korean situation was slightly different and somewhat improved in that Congress had approved a Stockpiling Act in the late forties which gave the Nation some of the materials it needed promptly.

The history of both World Wars, he said, brought Congress to the conclusion that the United States should have a stockpile for war use, and should maintain a going domestic mining industry to supplement the stockpile. He said it is highly important that mining "know-how" is maintained in the Nation and that the incentive is always present for exploration and development of mineral resources at home. He strongly em-



Mayor "Smiley" Washburn in full regalia was an attraction

phasized that the country cannot rely upon overseas sources for supplies of needed minerals during a war. He pointed out that the Defense Production Act has been helpful to mineral development but stated that it is not the final answer to domestic mineral security.

He complimented the Cabinet Committee on Minerals Policy for its excellent report and recommendations. He said it was the first clearcut exposition of a national minerals policy that the Nation has received. But, he declared, the recommendations in the report have not yet been carried out. He urged that the mining industry work on the Office of Defense Mobilization and with the newly-created Office of Minerals Mobilization to the end that the mining industry may be made a strong part of the mobilization base and that the Cabinet Committees' recommendations may become effective. He told his audience that he and the other friends of mining on the House Interior Committee would continue their efforts to build up the domestic mining industry during the next session of Congress.



Board of Governors Meeting

Western Board Meets

The Board of Governors of the Western Division of the Mining Congress met at luncheon on Wednesday, October 12. Roy A. Hardy, chairman of the Division, expressed appreciation to the Board and to all of the Committees who worked in the development of the Convention. He paid particular tribute to the fine program and to the successful efforts of the various local committees for the arrangements for the meeting and the trips to nearby plants.

AMC President Howard I. Young expressed his gratitude for the vote of confidence the industry had given him and particularly for the many kind words he had received from mining men when he was under fire in Washington from those who sought to discredit the fine work of "dollar-a-year" men in Government posts. He also voiced the appreciation of the entire membership of the Mining Congress for the fine work of the various Convention Committees, the press, and the local people in Las Vegas in making the meeting such an outstanding success.

Garner A. Beckett, president, Riverside Cement Co. was elected chairman of the Western Division for the coming year. In this post, he will be very active in developing plans for the 1956 Metal Mining and Industrial Minerals Convention and Exposition which will be held in Los Angeles, October 1-4.

Members of the Board of Governors of the Division, nominated by the various State mining associations, were also elected.

Julian D. Conover, executive vice-president, American Mining Congress outlined plans for the Los Angeles meeting and said that arrangements were being concluded for one of the finest expositions ever to be held in the West.

An invitation to hold the Convention in Salt Lake City in 1957 was received and approved. Plans for that meeting are also being formulated.

Program Committee Chairman L. J. Randall and AMC Coal Division Chairman L. C. Campbell also made a few brief remarks calling attention to the huge success of the Las Vegas gathering.

Barbecue and Western Party

On Monday evening genial, picturesque "Smiley" Washburn, honorary mayor of Last Frontier Village, greeted more than 2000 mining men and ladies at the Barbecue and Western Party. Here, surrounded by authentic relics of the old West, they went through the "chow" line to get a delicious chuck wagon dinner. There was roast beef and barbecued chicken and ribs cooked over coals in a pit dug in the ground.

After dinner many went on to en-

joy the second show at one or another of the famous hotels along the "Strip." Hundreds of others stayed around to enjoy each other's company, to talk to old friends, or to browse through the old-time village.

This was the only official evening entertainment function of the Convention. All other evenings were left open for Convention visitors to enjoy the fabulous shows at the Strip hotels. Special consideration for American Mining Congress guests made it possible to secure reservations at as many of these outstanding shows as time allowed.

Declaration of Policy

On Saturday and Sunday preceding the Convention, under the leadership of Kenneth C. Kellar, attorney of Lead, S. D., the Resolutions Committee met to whip into final form, for presentation to the Convention, policy declarations on matters of national import to the mining industry. These were presented to the industry for action at appropriate points during the Convention proceedings, and received wholehearted endorsement. They will serve as a guide in the work of the American Mining Congress during the year ahead. Copies of these resolutions are being given wide distribution throughout Congress, the Government departments and agencies responsible for mineral policies, the press, and other industries. The Declaration (reproduced on page 50 to 56) sets forth in simple, unequivocal language the considered opinions of the industry on matters vital to its strength and well being and consequently to the strength and security of the Nation.

Trips Attract Many

On Thursday morning air conditioned busses left Las Vegas for a trip



Garner A. Beckett, newly elected chairman of the Western Division

to the Molybdenum Corporation of America's operations at Mountain Pass, Calif. A large number of Convention goers took advantage of this opportunity to see how rare earths are mined and processed at this famous property.

Another group travelled to nearby Henderson where they saw the famous Three Kids open-pit mine and mill of Manganese, Inc. After lunch at the site of the immense wartime Basic Magnesium plant the group inspected the plants of Western Electrochemical Co. and U. S. Lime Products Corp.

Ladies' Program a Success

Following registration at the New Frontier Hotel—where they were also served morning coffee, the ladies' own special program got under way with a Welcoming Luncheon at the Hotel Riviera.



The ladies enjoyed Las Vegas with a program filled by luncheons, brunches, bingo, fashion show, a visit to Hoover Dam and high-class hotel entertainment



Mining officials talk with Nevada's Lieutenant Governor Rex Bell. Left, L. C. Campbell, Chairman, AMC Coal Division. Right, Charles A. Steen, President, Utex Exploration Co.

The brunch and fashion show in the Congo Room at the Hotel Sahara was voted an outstanding success. A second party, including lunch and Bingo, was arranged at the Show Boat for those unable to secure tickets for the fashion show.

The bus trip to Hoover Dam and Lake Mead on Wednesday brought out a sizable delegation of ladies who enjoyed the visit to this famous landmark.

Committees Deserve Thanks

That the American Mining Congress 1955 Metal Mining and Industrial Minerals Convention was such an outstanding success is due in large

measure to the efforts of the various committees. Co-Chairmen of the Arrangements Committee were Western Division Chairman Roy A. Hardy, consultant in charge, Getchell Mine, Inc. and the late Hewitt S. West, president, Manganese, Inc. Vice Chairman was Louis D. Gordon, executive secretary of the Nevada Mining Association.

F. A. McGonigle, vice-president, Manganese, Inc., was chairman of the Trips Committee and made all arrangements for the plant visits that so many of the delegates enjoyed on Thursday. Joseph W. Wells, president, Wells Cargo, Inc., headed up the Publicity Committee and the members of the Ladies Hospitality Committee

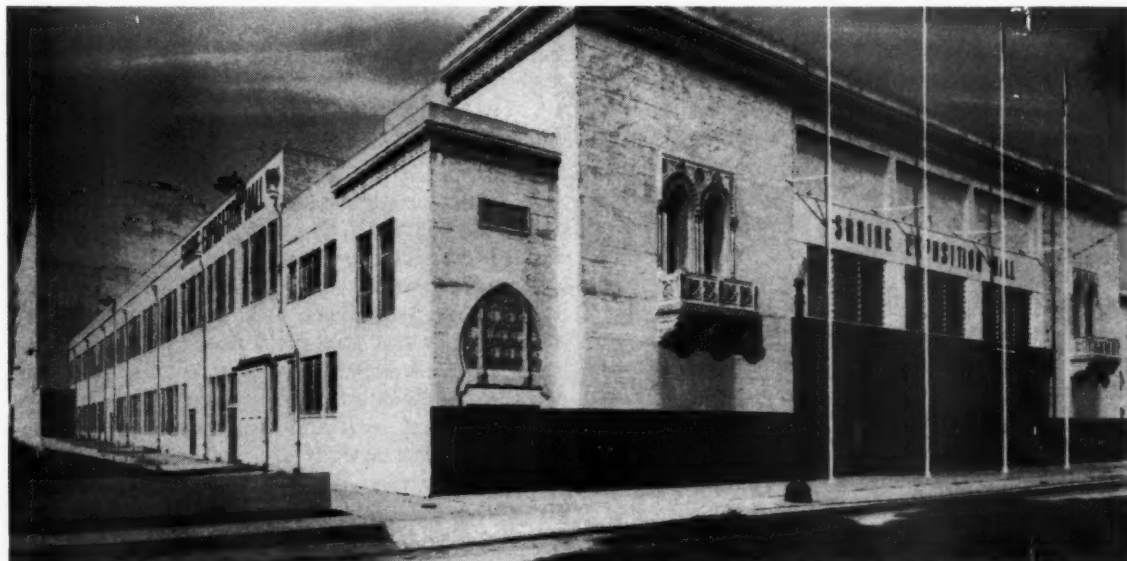
under the leadership of Mrs. Joseph W. Wells were indefatigable in their efforts to see that the visiting ladies had a good time.

1956 Mining Show

Under the leadership of Garner A. Beckett, president, Riverside Cement Co. and newly elected chairman of the Western Division, mining men all over the world look toward the big Metal Mining—Industrial Minerals Convention and Exposition to be held in Los Angeles, October 1-4, 1956. Work is already under way and plans are taking shape for what promises to be another great Convention and Exposition like the 1954 Mining Show in San Francisco. All phases of metal mining and industrial minerals production will come in for careful study during this meeting. For a liberal education illustrated with the latest in mining, milling, exploration and safety equipment be sure to plan a trip to Los Angeles well in advance.

The Las Vegas Convention has been one of the most successful in the long history of American Mining Congress Conventions as the more than 3000 mining men and ladies who attended will attest. They were unanimous in their enthusiasm. The operating sessions were a source of new ideas and inspiration and the lessons learned in them will be applied in the months ahead. In the sessions dealing with legislative and economic problems of the industry, a better understanding was molded as a result of the addresses from high Government officials and leading statesmen during the sessions devoted to these vital topics.

Out of meetings such as this progress consistent with the best traditions of the mining industry will be advanced.



Next year's show will fill three floors and parking lot at Los Angeles Shrine Exposition Hall

AMERICAN MINING CONGRESS

A Declaration of Policy

Adopted at Las Vegas, Nevada, October 10-13, 1955

WE commend the present Administration for its persistent and successful efforts to ease international tensions and promote world peace. We of the mining industry recognize only too well, however, that despite improved foreign relations our defenses must be maintained at a level to cope with any eventuality. Production of minerals and metals is essential to the welfare and security of the nation.

We believe the imminent monopolistic merger of the CIO and AF of L, the intrusion upon the American industrial scene of the principle of the Guaranteed Annual Wage—by whatever name it is called—and the aggressive political activity of unions armed with conscripted political funds of vast proportion, are storm signals which must be heeded if this nation is to preserve a sound and stable private-enterprise economy, and if we are to avoid the evils of labor socialism in our Government.

The President of the United States has made a constructive forward step in recognizing the importance of the mining industry by the establishment of Cabinet Committees on Minerals Policy and on Energy Supplies and Resources Policy, to develop national policies relating to the production and utilization of metals, minerals and fuels and the maintenance of an adequate "mobilization base" for the several branches of the domestic mining industry.

We commend these Committees for developing recommendations as a basis for sound national mineral and fuel policies. Prompt action should be taken toward making such policies effective.

In the past year a tremendous demand for certain metals has created higher prices to the advantage of some mineral producers. Other segments of the mining industry have not been so favored. We believe the Government should establish a broad policy designed to provide adequate protection to domestic mineral producers.

We urge our national leaders to continue their efforts to combat and eliminate communistic doctrines and influences wherever found.

The Government needs and should have the support and services of experienced business men

for the efficient administration of its widespread activities. We deplore the unwarranted and unfounded attacks on Howard I. Young, a man of the highest integrity and patriotism, who performed a magnificent service for the country in both World War II and the Korean emergency. Such attacks will render it extremely difficult to obtain the caliber of service so urgently needed in mobilization planning and operation.

We express our unqualified confidence in Mr. Young, who has so ably and unselfishly served the best interests of the United States and of the mining industry.

GOVERNMENT EXPENDITURES

Commendable progress has been made in reduction of Government expenditures, but further determined effort should be made and effective action taken so expenditures shall not be more than necessary to meet essential functions of government adequately and efficiently, honestly and fairly, without waste or extravagance and without political favoritism. This applies both to needs for national defense and for peacetime requirements, which are so great that they leave no place for extravagance, waste or unnecessary expenditures. This should be insisted upon by all within and without the Government.

TAXATION

To maintain the system of private enterprise and individual initiative under which our country and the productivity, prosperity and welfare of our people have developed, our tax system must not impair normal incentives for economic growth and development. To yield needed revenues, we must have tax laws which will not, by their tax rates nor their substantive provisions, discourage the investment, risk and effort necessary for income-producing activities.

The new Internal Revenue Code has made many desirable improvements to this end. Some of its provisions, in their wording or application, need revision, particularly as they fail to meet

their real intent, and should be revised to eliminate unnecessary technicalities and give them fairer and more appropriate application.

We commend the efforts which have been made to provide that taxes will be imposed and administered fairly, equitably and honestly. Our tax system must be well organized and administered to carry efficiently the immense load imposed upon it, preventing fraud, dishonesty and tax evasion, but with minimum difficulties and disturbance to honest taxpayers in preparation, examination and settlement of their returns.

With respect to future taxation, we make the following particular recommendations:

Depletion must be fully and equitably allowed to the mining industry,—both cost and percentage depletion. This is essential if we are to maintain an active, going mining industry essential for defense and needed in time of peace.

Present tax rates which leave too little incentive for maximum economic effort and initiative should be reduced, and in no case should the overall tax rate on the income of the taxpayer exceed 50%.

Allowance to stockholders on dividends with respect to taxes paid by the corporation should be further extended and depletion carried through to the stockholder on an adequate and equitable basis. Intercompany dividends should not be doubly taxed.

The tax benefit rule should be fully applied in determining the property basis for depreciation and for cost depletion.

Limitations on deductibility of exploration expenses should be removed.

Tax exemption should be granted to new mines for three years after beginning of profitable operation.

Capital gains should be taxed at more moderate rates.

The United States taxes on income created abroad should give full recognition to its taxability in the foreign jurisdiction. They should not create an additional tax load to impede or discourage activities abroad, and in no event should our taxes be applied to income which is not or cannot be returned to this country.

Our Government should cooperate, by treaty and otherwise, with any foreign government wishing to attract private investment and private enterprise, to remove or prevent obstructing economic, political or tax barriers. This will be a benefit to us, to our friends abroad, and to the peace and well-being of the world. Efforts should be continued and actively extended, through legislation and bilateral treaties, to eliminate barriers to private investment, to eliminate discriminatory taxes, and to reduce double or multiple taxation.

TARIFFS

We again endorse the Government policy that a strong, vigorous and efficient domestic metal and mineral industry is essential to the long-term

economic development of the United States and that an adequate mobilization base of metal and mineral production for our nation must look to domestic production and ore reserves for the major portion of our mineral and metal supply, despite progressive increase of imports of some of these materials.

Experience has shown that we cannot depend on foreign ore reserves as a source of supply in an emergency, however important it may be to import some metals and minerals to supplement domestic production and to fill our stockpile with materials in which we are deficient. World political conditions, as well as hazards of possible air and submarine warfare, support this conclusion.

We continue to recommend, therefore, that the Congress exercise its authority over tariffs, to be administered for the welfare of the American people and provide reasonable tariff protection. In this connection we endorse the recommendation of the U. S. Tariff Commission to the President on the industry's application for increased duties on lead and zinc.

We commend the members of the U. S. Congress who worked tirelessly to fulfill the Tariff Commission's recommendation. The President's alternative stockpiling program, while having certain desirable features which have been of material temporary benefit, is at best a stopgap solution and does not offer any real long-range cure to the problem of the American mining industry.

A reasonable and workable means of maintaining an adequate "mobilization base" in the production of critical and strategic metals and minerals must be worked out promptly. While each metal and mineral has different problems and each must be considered separately on its own merits, this mobilization base can be maintained in most minerals and metals by maintenance of a reasonable price. To accomplish this we favor enactment of excise taxes or flexible tariffs on imports, which may be suspended in whole or in part whenever prices are at an economic level that will permit the domestic mining industry to maintain such adequate mobilization base for national security. We oppose the use of direct subsidies, as leading to eventual government control or being impractical of equitable administration. The nature of mining requires that the industry make long-range plans, and revocable or stopgap measures by the Government contribute little to the real problem.

We recommend that Congress reject participation in any organization which places the power to regulate trade and foreign commerce of the

United States in the hands of any international body.

The industrial strength of our nation has proved itself to be the unfailing mainspring of defense of the United States and the world's free nations. As a keystone to this industrial strength, we strongly urge governmental policies which will assure the maintenance and encouragement of the fullest possible domestic production capacity in strategic and critical metals and minerals.

INTERNATIONAL AND UNITED NATIONS COMMODITY AGREEMENTS

We have opposed inter-governmental commodity agreements that call for control over industry or involve international regulation of production, distribution and prices of minerals and other raw materials. Consistent with this position our 1952 Policy Declaration opposed United States participation in the International Materials Conference. Again, in 1954, the Declaration expressed concern at the recent establishment by the United Nations of a Commission for International Commodity Trade. It also noted that the agenda of the Rio Conference of the Organization of American States included discussions on the establishment of new inter-governmental commodity agreements among the nations of this hemisphere.

We commend the Administration for having completely rejected inter-governmental commodity agreements at the Rio Conference last fall and for its forthright position in the United Nations Economic and Social Council at Geneva this past summer, where it announced that the United States will not find it possible to participate in the work of the United Nations Commission for International Commodity Trade, and that this Government would welcome the election of some other government on the Commission in its place.

STOCKPILING

We endorse a national policy of stockpiling of strategic and critical materials and the provision of adequate funds at all times for orderly purchases for possible emergency needs. As long as the security of the Free World is threatened, the nation's stockpiles must be filled. The vital necessity for adequate stockpiles remains unaffected by the recent lessening of international tension.

We believe the most efficient and economical procedure is to stockpile at times when output exceeds demand, and that it is in the national

interest to reduce or suspend stockpile purchases during periods when shortage of metals causes dislocation of production in defense and essential industries.

In connection with minerals and metals in which we normally are not self-sufficient, a definitely stated long-term objective should be fixed and adequate domestic prices paid to encourage the development of domestic reserves and the expansion of domestic production.

No withdrawals from the National stockpile should be authorized except in a declared emergency when national security clearly requires release of a particular material. We commend the Office of Defense Mobilization for its recent action in recognizing the clear intent of the Stockpiling Act in this respect. All metals and minerals acquired pursuant to the provisions of the Defense Production Act and the Agricultural Trade Development Assistance Act should be transferred promptly to the national stockpile, and should be subject to withdrawal only under conditions of a declared emergency.

We oppose the purchase or other acquisition of foreign metals and minerals for stockpile when adequate domestic supplies are available.

We believe continued operation of prospectors and small mining concerns is important because these smaller operations provide a pool of specialized knowledge and trained manpower available for the expansion of minerals production in the event of an emergency. Their activities also are the source of new mine discoveries of consequence.

PUBLIC LAND POLICY

The objective of the General Mining Laws is discovery and development of the mineral resources of the public domain by private enterprise. To effect this objective the laws invite citizens to prospect for minerals and upon discovery to locate valid mining claims. The mining laws also provide for protection of valid claims and the possessory rights thereunder prior to patent, and for transfer of legal title to private ownership by patent. The soundness of this system has been repeatedly demonstrated, and we reaffirm our confidence in it.

The Mineral Leasing Act of 1920, which established a system for acquiring rights to Leasing Act minerals, resulted in conflicts with the system for acquiring rights under the General Mining Laws. Public Law 585 of August 13, 1954, to provide for multiple mineral development of the same tracts of public land, was enacted to

remove this conflict. We commend the Bureau of Land Management for the careful preparation and prompt promulgation of rules and regulations to implement this law.

Pretended mining locations, made in bad faith, to serve objectives other than mining, with resultant damage to or improper use of timber, forage and other surface resources, made advisable legislation to provide for multiple use of the surface of public lands. Such legislation was enacted as Public Law 167 of July 23, 1955. This law takes nothing from the owners of valid mining claims located prior to its enactment; it provides to the owners of valid mining claims located after its enactment all rights necessary for prospecting, mining and processing operations; and it specifies that upon issuance of patent, the patentee in either instance shall acquire as full title to the mining claim and its resources as theretofore. We commend the Congress of the United States, the Department of the Interior and the Department of Agriculture for their recognition of the importance of the General Mining Laws in developing the mineral resources of the public domain, and for their support in preserving the basic concepts and principles of those laws in the proceedings which led to enactment of Public Law 167.

We commend the Congress of the United States and the Department of the Interior for opening to mining location vast areas that had been closed. We urge application of these policies to all public lands valuable for mineral development except National Parks and Monuments.

We are opposed to any general cession to the various States of rights in public-domain lands within the several States that would interfere with mining locations under the General Mining Laws.

We are opposed to extension of the Leasing Act system to minerals and metals locatable under the General Mining Laws.

Increasing rarity of occurrence of "grass roots" mineral discoveries, and increasing importance of employment of expensive equipment and modern methods in prospecting, point to the advisability of prompt consideration of constructive changes in the discovery provisions of the General Mining Laws which will afford a reasonable period of protection to those who in good faith seek a discovery.

LABOR RELATIONS

The boldest bid for economic and political power ever made by any group since the founding of

the United States is going relentlessly forward throughout the nation. Unsuccessful in their attempts to dictate to the executive branch of the Government and temporarily thwarted in their efforts to attain their objectives through legislative enactment, the labor bosses have opened a "second front" designed to seize and control the source of all power in a democracy, the vote of the electorate. Their programs of political action are being pressed vigorously in all of the forty-eight States. Armed with political funds which have never before been equalled either in amount or in non-accountability, they plan to overwhelm all who seek election to public office without their endorsement.

The people of this nation have always feared and rejected concentration of power in any person or organization. Never has there been greater cause to renew their fears, never more reason to reject the encroachments that are planned against the independence of their legislative bodies and their administrative officials.

In the face of this onslaught complacency on the part of those who believe in the principle of a free society under a democratic system of government will pave the way for the destruction of that principle and the establishment of labor socialism. Affirmative action must be taken to arouse the people of the nation to an awareness of this grab for power. Legislation must be enacted to strip the labor bosses of their most deadly weapon, enforced political contributions. To this end we continue to urge the abolition of compulsory unionism in any form. And to this end we urge a strengthening of the provisions of the Federal Corrupt Practices Act to eliminate the subterfuges whereby vast sums of money extorted from wage earners by power-hungry labor bosses are labeled as voluntary contributions and used to subvert democracy.

Preoccupation with this attack on the ballot box must not divert our attention from the legislative front. The fight to maintain and strengthen the basic principles of the Taft-Hartley Act still requires constant vigilance and affirmative action. We reiterate our convictions that compulsory unionism and labor monopoly are incompatible with the principles of individual liberty and a free economy, that Communism in labor unions constitutes a grave threat to our national security, that democracy in unions and the rights of individual workers must be affirmatively guaranteed, and that recognition of States' rights is essential to the continuation of our system of federated government.

We again urge that the Taft-Hartley Act be amended to:

1. Prohibit compulsory unionism in any form.
2. Prohibit labor monopolies and industry-wide bargaining.
3. Require the President, in threatened national emergency strike or lockout situations, to utilize the provisions of the Act.
4. Safeguard the functions of management from union encroachment by eliminating compulsory bargaining.
5. Protect the rights of workers by requiring supervised strike votes by secret ballot.
6. Effectively outlaw mass picketing, violence, intimidation and similar terroristic devices in labor disputes.
7. Maintain the stability of labor agreements.
8. Preserve to the States their right to regulate strikes and picketing; and
9. Effectively protect freedom of speech.

We again state our vigorous opposition to any of the following suggestions for amending the Act:

1. To permit further extensions of the principle of compulsory unionism under governmental sanction.
2. To outlaw State laws regulating or prohibiting compulsory unionism.
3. To eliminate safeguards against Communism in unions.
4. To permit replaced economic strikers to vote in representation elections.
5. To relax the prohibitions and procedures against secondary boycotts.
6. To qualify the exemption of supervisors.
7. To reduce union responsibility.
8. To relax limitations on the check-off.
9. To permit unilateral administration of welfare funds by unions; and
10. To eliminate the penalties for striking during the prescribed cooling-off period.

The forces of labor socialism are now openly on the march. Professional unioners who purport to speak for the wage earners of America are in fact using the wage earner as a stepping stone in their drive to achieve political and economic domination of the nation. The preservation of our system of government and of our individual liberties is up to every citizen. The need for united action by all freedom-loving individuals and groups is urgent. We dedicate ourselves to such action.

GOLD, SILVER AND MONETARY POLICY

We deeply regret that no steps have been taken during the year to terminate the policies with

regard to gold that are bringing about the extinction of the domestic gold-mining industry. The few surviving mines are faced with diminishing profits as costs expressed in depreciating paper dollars continued to rise while the producers must sell their gold at a price fixed over twenty years ago when the dollar had twice its present purchasing power. The right to own gold is still denied to the American citizen, and the gold miner is allowed no protection whatever against inflation.

Furthermore, with the Treasury acting as a middleman, gold in quantities greater than the entire annual production of the country is supplied to the so-called industrial consumers at \$35 per ounce, thus providing them with an unneeded subsidy at the expense of the miners.

Correction of this gross inequity by restoring to the American citizen the right to own, to buy and to sell gold, accompanied by termination of the sales of gold by the Treasury to industrial users, would be a simple step, involving no change in monetary policies with regard to gold, that would go far toward relieving the increasingly difficult plight of the gold-mining industry.

On broader grounds, however, we also urge that the gold standard be restored and the dollar made freely convertible into gold, domestically as well as through foreign agencies, with the gold content of the dollar fixed at an amount that reflects the existing depreciation of the currency.

The place of silver as a monetary metal for appropriate uses is well established, and we commend the policies of the Federal Government that have contributed to this desirable end. Consumption of silver for both industrial and monetary needs is now absorbing available stocks at an accelerated rate. We recommend continued acquisition of domestic silver by the Treasury for monetary needs and urge that the stocks of silver so acquired be held inviolate for such purposes.

In accordance with these views, we recommend:

1. That the restrictions on the purchase, sale and ownership of gold by American citizens be immediately removed.
2. That the monetary stocks of gold and silver be held exclusively for this dominant purpose, and that neither metal be sold by the Treasury for industrial uses.
3. That Congress fix the ratio at which the dollar and gold are to be made fully convertible and determine other technical procedures involved in the restoration of the gold standard, after receiving the recommendation of a Commission of its creation, to which men skilled in appraisal of the world's potential gold supplies as well as

men of competence in domestic and international finance and trade should be appointed by designated Government authorities.

4. That the restoration of the gold standard, with the dollar and gold made convertible at the specified ratio, be accepted as a policy and every effort be made to achieve this objective at the earliest practicable time.
5. That the existing Federal policy be continued with regard to the acquisition, by the Treasury Department, of newly-mined domestic silver, both for its beneficial influence upon the base-metal mining industry and for its traditional service in providing a base for a portion of the nation's currency; that Congressional action recognize the increased cost of producing silver by reducing the seigniorage now charged by the United States Treasury upon newly-mined domestic silver; and that the silver purchase program be retained.

ENERGY RESOURCES

The forward movement in the development of the American industrial economy means that there will be a tremendous corresponding rise in the need for energy in the years ahead. Such expansion will draw heavily upon the nation's energy supplies and fuel resources. The nation has a high stake in the maintenance of the productive capacity of the coal industry as insurance against future energy needs.

The general welfare and the defense potential of the United States require the establishment of a sound national fuel policy which would encourage conservation practices and achieve balance in the present use of our energy resources, with the aim of strengthening the national defense, providing orderly industrial growth, assuring energy supplies for our expanding economy and providing for any future emergency.

URANIUM

The U. S. Atomic Energy Commission should be highly commended for its continuing efforts to encourage the establishment of maximum domestic reserves of uranium ores, thereby enhancing our nation's security. In order that these objectives may be more rapidly and efficiently realized and the orderly development of the comparatively new uranium industry fostered, present systems and methods of encouraging production should be continued, with adjustments to meet conditions as operations in this field expand.

We further recommend that the Atomic Energy Commission assure the domestic uranium raw

materials industry that an adequate purchase program will be continued through such period beyond the present termination date as the Government retains monopoly of the purchase and use of uranium ores and concentrates. Public announcement to this effect should be made promptly. The Commission should advise the industry upon reaching any decision to terminate the purchase plan and the use monopoly, and it should provide a reasonable and adequate plan for the transition to the period when industrial requirements will be dominant.

In order to achieve maximum recovery of known reserves, the AEC should absorb penalties now being imposed for high-lime content of ores—a characteristic of many of the larger deposits in the United States. These penalties have the effect of reducing the tonnage ultimately available by rendering uneconomic the removal of other than high-grade ores.

More mine-to-market roads should be planned and completed with all possible speed.

GEOLOGICAL SURVEY—BUREAU OF MINES— BUREAU OF LAND MANAGEMENT

The Geological Survey, the Bureau of Mines, the Bureau of Land Management are the three bureaus of the Department of the Interior most intimately concerned with the administration of public lands in their relation to the mining industry.

We have noted with satisfaction that the bureau chiefs have put into effect many of the administrative recommendations of the Department's survey teams, and that as a result there has been improved service to the public while operations have been more economic and efficient.

We again compliment the fine technical and administrative personnel of these three bureaus on their many valuable services to the mining industry, including their research, explorations, and publications—maps, scientific papers and reports.

While expressing gratification that appropriations for geologic and topographic mapping have been increased for the current fiscal year, we again emphasize the vast backlog of unmapped terrain needing attention and urge such further increase in funds for this vital work as a sound budget policy will permit.

We urge that further efforts be made to transfer all Federal responsibilities affecting mineral resources which have been scattered among various other departments and agencies to the Department of the Interior, through its Geological Survey and Bureau of Mines, so that such functions will be the responsibility of the two bureaus best qualified to administer them.

MINE FINANCING

We recommend that Congress reconsider the whole question of Securities and Exchange laws, rules and regulations, to the end that the desirable objectives of the present law be maintained and that obstructive or unnecessary features be corrected by appropriate amendment or repeal.

We recommend that the Small Business Administration liberalize its qualifications for granting loans for worthy mining enterprises, and that the loan activities of the Defense Minerals Exploration Administration for defense metals and minerals be continued and adequately financed.

MINE SAFETY

We firmly believe that the health and safety of men working in mining operations are the primary responsibility of the mine operator. We believe that any necessary safety regulations should come from within the governmental structure of the States. The steady yearly decline of accidental deaths and injuries within the mining industry has demonstrated the effectiveness of this approach.

We heartily commend the U. S. Bureau of Mines for its excellent service to the mining industry in developing and disseminating improved techniques in mine accident prevention and in recognizing, by granting awards, outstanding safety performances. This important work deserves adequate financial support.

WATER AND AIR POLLUTION

Problems having to do with water and air pollution, in their very nature, are local not national in scope. Because of a knowledge and understanding of local conditions the solution of pollution problems can best be achieved by the cooperative effort of all concerned. Where local conditions require the solution of pollution problems that affect two or more States, the appropriate end may be achieved by interstate compacts.

We urge the Congress in its consideration of water and air pollution legislation to fully respect

local and State jurisdiction in the field of control laws, standards and regulations, to provide accelerated amortization for pollution control facility installations, and to provide for research on basic causes of pollution which can be used by industry and communities in evaluation of such control measures as may be needed in specific area problems.

RADIO FREQUENCY ALLOCATIONS

We urge the Federal Communications Commission to allocate additional radio frequencies for the use of the mining industry.

Effective radio communication is vital to the operations of the industry.

There are presently over 8000 stations, most of them crowded into only 5 channels which must be shared by mining with such unrelated activities as: farmers, ranchers, manufacturing plants, crop dusters, and refrigeration servicemen. Other industries have frequency allocations of their own, such as 39 for the railroads, 7 for motion pictures, 9 for petroleum and forestry, and 9 for the public utilities.

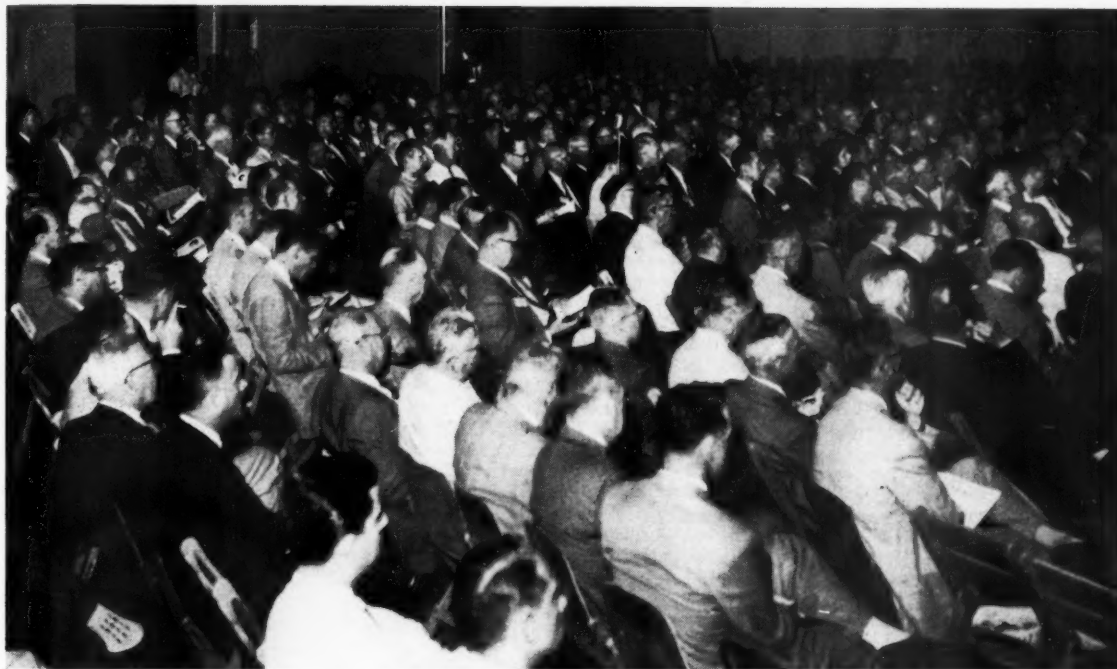
The present inadequate frequency allocation to our industry is already depriving many mining operators of the benefit of effective radio communication needed for efficient operation, and the situation is rapidly becoming worse.

GOVERNMENT REORGANIZATION

We wish to commend all those who have participated in the work of the Commission on Organization of the Executive Branch of the Government, popularly known as the Second Hoover Commission.

We strongly urge that favorable action be taken to implement the Commission's sound recommendations concerning the proper functions and policies of the executive department. It is only by such considered appraisal and evaluation that competing and overlapping responsibilities may be eliminated to achieve economy and efficiency in the operation of our Government. We are in accord with the principle that Federal Government intervention should be limited to those matters which the people themselves, through private enterprise or their local or State agencies, are unable to undertake or carry out.

The essential functions of government must be conducted without waste, extravagance, or unnecessary expenditure if we are to bring about reduction of the cost of government to those who must support it.



Attentive crowds filled the meeting halls

Report on Convention Sessions

Overflow Audiences Participated in the Discussions of Industry's Problems. The Following Pages Give a Full Report of the Various Convention Sessions and Special Conferences. It Is Impossible, Within the Limits of a Single Issue, to Present Even an Abstract of Each of the Addresses by the 128 Speakers Who Took Part in the Program. It Is Planned to Publish Many of These Papers During the Months Ahead to Bring This Wealth of Valuable Information to the JOURNAL's Wide Circle of Readers

OPENING SESSION

THE initial session of the Convention got under way Monday morning. Howard I. Young, president, American Zinc, Lead & Smelting Co. and president of the American Mining Congress, presided at a discussion of "National Policies and the Mining Industry." Mr. Young complimented the Administration on the report of the President's Cabinet Committee on Mineral Policy and called on the Government to expedite its implementation.

The first speaker of the morning was Secretary of the Interior Douglas McKay, who said that the mining in-

dustry is one of the prime sources of our national strength. "As the primary minerals agency of the Federal Government," he stated, "the Department of the Interior has the job of teaming with you to assure a supply of raw materials to meet the requirements of security and the highest level of economic activity the Nation has ever known." Keeping out imports will not solve the problems of the mining industry, he declared, as we can no longer fight a war or sustain an industrial economy without the aid of materials from foreign sources. "This does not mean, however," he explained, "that we should not maintain a vigorous domestic mining industry. . . . We shall, of course, if necessary and in the national interest, use such regulation

of imports and financial incentives as may be required to accomplish this objective."

McKay reviewed the various activities of the Department of Interior which are designed to bring about the wise use of our mineral resources, including those of the Geological Survey and the Bureau of Mines. He said that the work of the Defense Minerals Exploration Administration is intended to improve our security position and that the newly created Office of Minerals Mobilization will be responsible for outlining the mobilization base in the field of minerals and metals.

He told of the recent creation of 14 industry advisory committees to consult with and advise the Director of Minerals Mobilization—each group to

be concerned with one mineral commodity.

Arthur S. Flemming, director, Office of Defense Mobilization, said that many of the beneficial accomplishments of his office would not have been possible without the far-sighted and devoted leadership of Howard I. Young, who served in Government during the Korean emergency.

Flemming discussed the problems of the Defense Mobilization program and declared that the United States must be prepared to mobilize for any emergency. He revealed that most stockpile goals will be reached in the next few years and will provide a mobilization base capable of supporting both our defense and civilian economies.

He said the Department of Defense is now preparing new mobilization plans, considered in light of our new military weapons. He stated, however, that the Office of Defense Mobilization will continue to close "gaps" in the stockpile without waiting for the Defense Department to complete its work.

He said that any program conducted under the Defense Production Act of 1950, as amended, must be related to defense expansion goals. Any other mineral program, not related to our mobilization base, must be justified for reasons other than security, he stated.

LABOR AND MANAGEMENT PROBLEMS

DENISON KITCHEL, chairman, AMC Labor Relations Committee, Phoenix, Ariz., presided at the Monday afternoon session on Labor and Management Problems and Public Relations.

Senator Barry Goldwater of Arizona, in discussing public relations in mining communities, declared that public relations is a person-to-person acceptance which exists only where there is mutual understanding, mutual respect, and mutual confidence. "If we want the general public, and this includes our employees, our customers, and our stockholders to listen to us and to respect our problems," he said, "we must break down and destroy every barrier which serves to separate us from them and their problems." He said that successful public relations must produce a profit for all participants.

"A proper public relations program must begin at home with your fellow workers, your own employees," he stated. "Let them have a share in your problems. Let them work with you and not for you. Let them know you on a person-to-person basis, and take the trouble to know them the same way."

Developments under the Taft-Hartley Act were reviewed by Philip Ray

Rodgers, acting chairman, National Labor Relations Board, who stated that recent allegations to the effect that the work of the National Labor Relations Board is held up because of its incomplete membership are completely untrue. "The fact is that at this moment not one single case is stymied at the Board level by a two-to-two split among the membership," he declared.

One course of action which the Board has undertaken in recent years which is of great significance, he said, has been to use its powers to expose, and cause the removal of, certain Communists who have obtained positions of leadership in some so-called labor organizations. Although the legal powers conferred upon the Board by the Taft-Hartley Act may not be sufficient to enable it to meet this problem by its own resources, he stated, the fact remains that through a combination of circumstances—the publicity attendant on the Board's action, the

Rufus G. Poole, attorney, Washington, D. C., discussed trends in labor relations and declared that American industry in the last 10 years has gone a long way toward establishing a pattern of an annual wage increase. "With a continuing climate of economic prosperity, I should predict that labor will annually insist on more and more and will be successful in getting it," he declared. "This is already foreshadowed by the large number of long-term contracts which provide for fixed increases in 1956 and 1957."

In discussing the guaranteed annual wage, he forecast that the unions will try to enlarge the benefits of GAW each year, which will require the employer to increase contributions beyond five cents per hour for each employee. The long-range cost of the GAW could well have a depressive effect on future business planning, he declared, as many employers will be reluctant to employ more people than they can use steadily and management



Secretary Douglas McKay outlined mineral policies

passage of legislation by Congress, and the continued and unwavering efforts of the real leaders of the American labor movement—these Communist-controlled outposts have begun to crumble. "The members are deserting their Communist-inspired leaders and turning in ever-increasing numbers to the legitimate American labor unions," he declared. "It is my hope and belief that this trend will continue at an accelerated rate, until the Communists are completely abandoned, and the loyal, but misguided, members of these so-called unions are once again enrolled in the ranks of genuine labor unions of America."

He declared that the Taft-Hartley Act is a sound and just law which achieves a remarkable balance between powerful and conflicting interests "by restraining the excesses of all and denying the essentials of none. The intrinsic merit of this statute is borne out by the fact that it has safely survived the expressions of opprobrium and promises of doom which marked its birth and attended its early years."

will be tempted to match its employment guarantee with guaranteed business.

He said that the projected merger of the AFL and the CIO was motivated primarily by political purposes, and is of great significance as most employers will find themselves dealing with a much tougher bargaining agent.

"We hear little about the effect of trade union policies upon the personal liberties of the individual worker," he declared, "which is hard to understand when viewed against the background of American industry and its deeply rooted traditions of individual liberties." Through compulsory unionism, unions deprive the individual worker of his freedom of choice, he said, and the individual has few opportunities to participate in the formulation of the basic policies of the union under which he is going to have to work. "We cannot assume, however, that in the years to come the individual wage earner will not fight to regain the rights he has lost," he concluded.

Trends in employe housing and

townsite development and financing were reviewed by Gerald H. Galbreath, Jr., vice-president, John W. Galbreath & Co., Columbus, Ohio, who reported that the present trend in employee housing is for the operating company to get out of the real estate business. In accomplishing this move, he recommended a program of house sale to the employees. Intelligent planning and thought must be given to such a program, he stated, if the new town is to stand on its own feet and not be a burden to the company. In cases where new townsites are necessary, he concluded, the company should enter into the development only for financing and the establishment of the over-all policy, and should delegate to specialists the creation of the community.

MILLING AND METALLURGY

The Milling and Metallurgy session on Monday afternoon with F. D. DeVaney, chief metallurgist, Pickands Mather & Co., Hibbing, Minn., as chairman featured papers on several of the newer innovations in the milling field.

R. E. Durocher, assistant manager, New York Ore Div., Jones & Laughlin Steel Corp., Star Lake, N. Y., spoke on the Aerofall Mill at Star Lake. Starting with a pilot plant, tests of which indicated favorable metallurgy because of the excellent liberation obtained of the iron minerals from the gangue, the company utilized a 17-ft by 5-ft aerofall mill in subsequent plant expansion. Durocher gave a complete description of the mill with details of how it is used at Star Lake. The electronically controlled mill solved many of the concentrating problems under conditions of varying feed and moisture. As compared to the conventional rod mill product, the aerofall product gave superior recovery when used with Humphreys' spirals.

L. M. Barker, manager, J. E. Tapin, concentrator superintendent, and R. C. Barr, metallurgical assistant, Morenci Branch, Phelps Dodge Corp., Morenci, Ariz., in a paper delivered by Barker, covered the application of the liquid-solid cyclone as a classifier in closed circuit grinding at the Morenci concentrator. In both the concentrate regrinding operation and in primary grinding, cyclones operating with ball mills gave better products than standard classifiers. The problem of excessive abrasion, up to the present, has not been satisfactorily solved.

S. J. McCarroll, general superintendent, Manganese, Inc., Henderson, Nev., spoke on Cyclone Classification and Concentration. He stated that cyclones operating at six to seven-lb pressure make a better separation than mechanical settling type classifiers. Eight cyclones are being used by Manganese,

Inc. to disperse and thicken manganese concentrates. He pointed out that the concentrates tend to agglomerate into beads and pellets which will plug up a settling type thickener. It was predicted that the application of liquid cyclones as thickeners will increase.

L. J. Erek, chief metallurgist, Cleveland-Cliffs Iron Co., Ishpeming, Mich., described the basic principles of the cyclone and with clear slides showed how it operates and enumerated at length its many possible applications.

Earl C. Herkenhoff, metallurgist, Pickands Mather & Co., Hibbing, Minn., in his paper, "Control of Cyclones and Cyclonic Systems," discussed the variables in cyclone operation which permit the operator to control the separation. Control systems involving adjustable apex openings and dual vortex finders were described. Herkenhoff analyzed the abrasion problem and told of the various liner materials used to overcome it.

"Modernization of Pandora Mill at Telluride" was the subject of a paper by Frank W. McQuiston, Jr., chief metallurgist, Newmont Mining Corp., New York City. Reduction in operating cost was accomplished by cutting the operating week from seven days to five days, thus making a saving in both manpower and maintenance. To do this, mill capacity was expanded 40 percent but at a cost of only eight percent above the original mill cost. The mill products at Telluride are gold bullion, lead, copper and zinc concentrates.

EXPLORATION AND GEOLOGY

THE Monday afternoon session, presided over by J. D. Forrester, Dean of the College of Mines, University of Idaho, and devoted to "Exploration and Geology," featured a series of interesting and instructive papers.

"Geophysical Exploration in New Brunswick," by Harold O. Seigel, consulting geophysicist, Toronto, was read in his absence by E. B. Gillanders, managing director of Algom Uranium Mines, Ltd. With accompanying slides, the paper demonstrated that four major pyritic lead-zinc ore deposits, including two exceeding 25 million tons, had been discovered in the Bathurst-Newcastle area of New Brunswick since 1952 by geophysical methods—three from the ground and one by airborne electromagnetic equipment. Follow-up by geochemical and gravimetric methods determined which of the conductors were caused by graphite and which by sulphide mineralization.

Hubert W. Lakin, U. S. Geological Survey, Denver, spoke on "Methods of Geochemical Prospecting," with supplementary laboratory demonstrations by A. P. Maranzino. Lakin pointed out

that methods of trace analysis, to be useful in geochemical prospecting, must be adaptable to field conditions. He described and appraised various types of analysis used in geochemical prospecting. USGS has developed and tried a mobile unit in the West and had that unit on display behind the meeting rooms.

N. K. Mukherjee, University of Alaska, cited research at his institution to develop geochemical prospecting methods for the total heavy metals in soil. By colorimetric analysis of elements in surface soils it is possible to establish a pattern of the anomalous values which may indicate ore bodies.

T. O. Evans, chief mining engineer, The Atchison, Topeka & Santa Fe Railway Co., gave an extemporaneous talk on how geobotanical interpretations have been useful in uranium exploration.

W. R. Van Voorhis, Penn College, Cleveland, Ohio, in his paper "Operations Research Applied to Nickel Reserves at Riddle, Oregon," described the methods used to estimate the nickel content for various levels of mining and place probability confidence limits on these estimates.

The final paper by Hugh A. Shamberger, State Engineer of Nevada, on "Ground Water Problems in Desert Areas," pointed out the most serious and complex ground water problems in the West are those in which: "(1) pumping exceeds discharge; (2) pumping exceeds the ability of the aquifer to transmit water; and (3) ground water is closely related to water in nearby streams." He stressed the need for more study to solve these problems.

PUBLIC LANDS

ON Tuesday morning Senator Frank A. Barrett (Rep., Wyo.) presided at the session on Public Lands. The Senator reviewed the provisions of his bill, S. 680, introduced in the Senate this year, which calls for the return by the Federal Government to the States of the mineral rights on Leasing Act minerals, and declared that enactment of this legislation would carry out the intent of the Constitution relating to the sovereignty of the States.

Rep. Harris Ellsworth (Rep., Ore.) reviewed the general objectives of Public Law 167, which provides for multiple use of the surface on the same tracts of public lands on which mining claims are located. He said the necessity for this legislation became apparent several years ago when the value of timber stumpage on national forests and other government-owned lands increased to its present fantastic price. "The provisions of the old mining laws pertaining to the filing and patenting of mining claims were used by many predatory individ-

uals who had no slightest interest in mining," he stated, "but who thought to acquire at least numerous rights, if not ultimately ownership, in the national forests." The mining industry itself was generally blamed in the national furor of publicity in these so-called timber-mining-claim filings, he stated, and the new law takes that bad publicity problem off the back of the mining industry.

The provisions of the new law as they affect the mining industry were further explained by Senator Clinton P. Anderson (Dem., N. M.). He stressed that the legitimate miner will not be penalized by the act and will be free to go on the public domain, including the national forests, and prospect for, develop and mine the minerals contained therein.

Public Law 585, enacted by the 83rd Congress, which provides for multiple use of the same tracts of public lands by the mining industry and by Leasing Act operators, was discussed by Assistant Secretary of the Interior for Land Management Wesley A. D'Ewart. Secretary D'Ewart pointed out that enactment of Public Law 585, providing for multiple mineral development, paved the way for the enactment of Public Law 167, providing for multiple surface uses. He pointed out that both laws were compromises between the various using parties and praised all those who cooperated in securing the enactment of the legislation.

Richard E. McArdle, Chief, U. S. Forest Service, discussed the problems of the Forest Service encountered in administering the public lands under its jurisdiction. McArdle complimented the mining industry for its understanding of the many problems as well as for its fair and logical contribution in securing the enactment of remedial legislation, which will provide a fair solution to the problem without injury to the users of the public lands.

A complete review of enacted legislation which affects the grant of certain sections of public lands to the various States for the support of their common schools was made by Senator Arthur V. Watkins (Rep., Utah). Because it will be many years before cadastral surveys are completed, and because the States will not receive their grant of school lands until these surveys are completed, the Senator said that mining locations will have been made in the most promising areas, with a consequent loss to the State and the necessity of selection by the State of nonmineral lands at some later date. At the present time, he explained, the State may select liei lands where they have found mining claims to have been made on areas contained within their grant. However, he declared, the present law should be changed to permit lieu selec-

tions to be made on lands which are mineral in character for base lands lost. He said the mining industry could be adversely affected by this problem, as several measures designed to correct it would preclude or defeat locations under the mining laws. "I believe it is desirable to resolve the problem in the best interest of all users of the public domain," he said.

Senator Watkins also reviewed the provision of S. 531, which he introduced this year. This measure would require public hearings prior to a withdrawal of public lands by the Federal Government and would limit temporary withdrawals to five years. He said the measure would also require the Secretary of the Interior to periodically review the need for continuance of a withdrawal of any public lands and, upon request of the State, to hold public hearings in any State in which any such lands are situated for the purpose of determining whether or not such lands should be released from withdrawal.

Congressman Cliff Young (Rep., Nev.) said the mining industry as well as other public land users are faced

proximately 7,000,000 acres of lands withdrawn for power-site development. He said that the new law, which contains provisions regulating placer mining, was a compromise between his views and those of the Department of Interior and the Forest Service. He explained that the measure permits mineral entry and location on such lands but provides that the Government will have the right at any later date, at no liability, to utilize these lands for power-site development.

W. Howard Gray, attorney, Ely, Nev., said that he was in agreement with the contentions of Senator Barrett to return Federal revenues from Leasing Act minerals back to the States, but expressed the view that this could be done just as effectively by amending the present law to provide that 90 percent of the revenues from such leases, instead of 37½ percent, be paid to the various States.

William G. Waldeck, attorney, Montrose, Colo., called for amendment of the mining laws relating to discovery requirements. He cited the present methods of prospecting, including geo-



Public Lands questions were thoroughly discussed

with a very serious problem caused by the withdrawal of public lands by the Department of Defense. He cited the present situation within the State of Nevada, where vast areas have been withdrawn by the military and where further sizable withdrawals are contemplated. He expressed the belief that the Defense Department should require a fuller utilization of lands already withdrawn by means of joint usage between the military services—which is not the case at present. Rep. Young called for a complete examination of this situation by Congress next year and asked that hearings be scheduled to seek a solution to the problem.

Rep. Clair Engle (Dem., Calif.) reviewed the provisions of Public Law 359, enacted this year, which provides for mineral entry and location on ap-

physical and geochemical surveys and airborne scintillometer techniques, which have proven adequate to locate ore bodies beneath the surface. He said that such discoveries are not recognized under present law, as all legal decisions to date have required that an ore body must be reached by shaft or drill holes before the claim becomes valid. He said this has resulted in much confusion as well as litigation, especially in the areas of intensive exploration for uranium. He asked that Congress take up this problem at the earliest possible date.

Prior to presenting the Report of the Resolutions Committee on Public Land Policy, Raymond B. Holbrook, Counsel, Western Operations, U. S. Smelting Refining & Mining Co., and Chairman, A.M.C. Public Lands Com-

mittee, expressed his gratitude for the assistance and cooperation received from the Secretaries of the State Mining Associations and the members of the Public Lands Committee in the task of working out the many problems encountered during the consideration of Public Law 167.

DRILLING AND ROOF SUPPORT

THE Drilling and Roof Support session on Tuesday morning under the Chairmanship of S. S. Goodwin, vice-president, New Jersey Zinc Co., New York, brought out much of interest to underground men. A complete evaluation of airlegs vs jumbos was given by S. S. Clarke, consultant, Baxter Springs, Kans. He spoke of the experiences at the Tri-State mines of Eagle Picher Co. In that district they found the airleg drill machine to be an excellent special purpose machine, but were not so effective on a large-scale rock-breaking job. Clarke described all considerations pro and con and came up with some interesting cost figures.

A discussion of airleg drifting practice at the Kerr-Addison Gold Mines, Northern Ontario, by J. L. Ramsell, manager, Kerr-Addison Gold Mines, Ltd., Virginiatown, Ontario, was read by E. R. Borchardt of the Anaconda Co. Kerr-Addison has been successful in cutting costs through use of airleg drills in drifting work. A major advantage was the ability to complete a cycle including mucking and tramming in a 7½-ft round in one shift by using the airleg machine.

H. A. Corre, mine superintendent, Warner Co., Bellefonte, Pa., related drilling and blasting practices at Bell Mine. He illustrated, with the help of slides, both the shrinkage stoping and sub-level caving methods used at Bellefonte and showed how rotary drilling practices fit into those systems. Drilling methods, blasting practices and bit performance were described in detail.

Richard F. Moe, mine superintendent, White Pine Copper Co., White Pine, Mich., spoke on "Rotary Drilling Developments at White Pine Mine. He described the use of eight-in. rotary auger drills in burnt-cut drifting work and further described the experiences of White Pine with small-hole rotary drilling. He cited the major problem of bit performance in rotary drilling.

"Yieldable Steel Arches for Roof Support" were discussed by R. W. Sleeman, chief mining engineer, Bethlehem Cornwall Corp., Cornwall, Pa., and R. C. Nispel, underground mine superintendent, Nevada Mines Div., Kennecott Copper Corp., Ruth, Nev. Sleeman traced the development of the yieldable arch by his company, describing in detail the design and appli-

cation of the yieldable steel arch at its Cornwall, Pa., magnetite mines. He compared the costs of concreted drifts using roof bolts with the more recently developed steel supports. His searching analysis of all considerations showed that the yieldable steel arch has a place in rock support in heavy ground. Nispel described the application of the yieldable steel arch at the Kennecott Copper Corporation's old Ruth Mine, where the block caving method is used. Because of the necessity to maintain uniform continuous draw of a block of ore a timber failure in the branch raises is costly. The company is trying the yieldable steel arch in an attempt to get away from this failure.

URANIUM MILLING

HIGHLY informative papers were presented at the Tuesday morning session on "Uranium Milling" with T. O. Evans, chief mining engineer, Atchison, Topeka & Santa Fe Railway Co., as chairman.

"The History and Trends of the Uranium Plant Flowsheet" were presented by A. Q. Lundquist, general superintendent, co-authored with J. L. Lake, chief metallurgist, Union Carbide Nuclear Co. The progress of the uranium, vanadium and radium concentration plants on the Colorado Plateau was traced from early operations before 1900 to the modern uranium milling plants of today. Lundquist showed slides of flowsheets depicting all of the plants and described the innovations which have taken place through the years. The more recent circuits of the uranium mills of North Continent Mines and Union Carbide & Carbon Corp. were also covered. A flowsheet of a typical modern acid-lead uranium circuit was discussed in detail.

E. H. Crabtree, director of the Colorado School of Mines Research Foundation, Inc., discussed the same subject and emphasized that we have a wealth of past history on the milling of uranium, vanadium and radium. Contrary to popular belief we can draw from experience on the processing of uranium dating back to 1890.

Clyde E. Osborn, general superintendent, Navajo Uranium Division of Kerr-McGee Oil Industries, Inc., spoke on the operational problems in starting a new uranium mill. Developing a good operating crew was important in an area of limited labor supply, he said, and a housing program had to be instituted at the site of the new Shiprock Mill. Experienced mill men were brought in and Navajo Indians were hired for helper and labor classifications. The Dorr Co. sent top-flight men to help in the technical and training aspects of starting the mill. Os-

born cited the never-ending fight against corrosion in an acid-processing plant and described the effect of freezing weather on operating a new plant. Despite all difficulties, he said, the uranium processing methods proved successful from the beginning.

Paul C. Henshaw, exploration geologist, Homestake Mining Co., in his paper "Lime Penalty on Uranium Ores" reviewed the provisions of the lime penalty imposed by the Atomic Energy Commission. He traced the origin of this penalty and pointed out its disadvantages, stating that it will prevent the mining of a very considerable tonnage of marginable uranium ore with an intermediate to high lime content. Henshaw stated that large reserves of high-grade uranium ore would be available for any extraction plant located near the Big Indian area if that plant is designed around a no-penalty process.

An excellent extemporaneous talk was given by Paul Jones, chairman, Navajo Tribal Council, Window Rock, Ariz., on Indian relations. Jones indicated what the Indian Council was willing to do to help prospectors obtain leases on the reservations. Jones' remarks on the Indians' desire to cooperate with the uranium industry were well received by his audience.

OUTLOOK FOR THE MINERAL INDUSTRIES

ON Tuesday afternoon L. J. Randall, president, Hecla Mining Co., Wallace, Idaho, was Chairman of a panel which presented the Outlook for the Mineral Industries.

In discussing the outlook for the nonferrous metals, Charles R. Ince, vice-president and sales manager, St. Joseph Lead Co., New York, said that although copper, lead and zinc seldom compete with each other in the market place, they do have certain common economic characteristics which include "(1) all three metals are international commodities, subject not only to the play of world-wide competitive conditions but also subject to the competition offered by other materials; (2) since World War II we have become on balance an importer of all three metals—whereas before the war we produced our requirements of primary lead and even had a slight exportable surplus of copper and zinc, while today we require 30 percent of our copper from abroad, nearly 50 percent of our lead and 30 percent of our zinc; and (3) the deficits since the war have been made up by imports from abroad which have been available as long as free Europe had not yet reached pre-war levels of consumption." He pointed out that recent high rates of industrial activity abroad are largely responsible for the great rise

in primary consumption of these metals during 1954 and 1955.

The producers' price at the present time of over 40 cents a pound for copper, Ince said, has been caused by new high levels of consumption coupled with a series of work stoppages that kept supplies well below demand. As a result of strikes, he estimated that an output of about 250,000 tons of copper have been lost, which has caused a shortage now well beyond the acute stage. "In the face of this strong demand and shortage in supply," he said, "the industry has expanded substantially and will expand still more. . . . Output in the United States, barring artificial restraints such as strikes, should climb steadily, reaching an annual rate of about 1,200,000 tons by 1956." He considered it a fairly good bet that production of copper will "catch up with demand during the rest of this year. . . . Therefore, one can say with reasonable certainty that further price movements in copper will be downward, but how fast and how far is anybody's guess."

In discussing lead, Ince said that recent price levels here and abroad appear to be adequate to bring out sufficient supply to take care of an extraordinary high rate of consumption abroad and an excellent demand here. In this country we are consuming lead at a rate close to 1,200,000 tons a year, while at the same time the Government has been purchasing lead for the long-term stockpile. He said that as of July 1, it had purchased 137,000 tons of an announced objective of 200,000 tons and the stockpiling program should continue through 1956 at recent rates of acquisition. He forecast a healthy outlook for lead through at least the early part of 1956 as well as a likelihood that a stable price structure would exist for a long period.

A favorable fixed picture from the point of view of consumption is foreseeable for zinc, he stated. The per capita consumption, he reported, has improved from 10.2 pounds to 11.5 in the last 25 years and during the first six months of 1955 it hit 13.4 pounds.

The die casting industry is currently using 48 percent more zinc this year than last year and nearly 30 percent more than the previous high in 1950, he said. The American Die Casting Institute is predicting still greater use of zinc, assuming stable markets at present prices. Here again Government stockpiling is a major factor in our market, he pointed out, because as of July 1, 181,000 tons of zinc had been purchased against a long-term objective of 300,000 tons.

In conclusion he said that the use of copper, lead and zinc has not kept pace with the rate of industrial expansion in the United States, which indicates that the metals have lost ground in relation to our industrial

growth. "If there is one thought that I would like to leave with you today," he said, "it is the desirability, rather than the necessity, of contributing by research and promotion, individually and through trade associations, to furthering the use of our product."

A review of the iron ore industry was presented by A. L. Fairley, Jr., vice-president and general manager, Snyder Mining Co., Pittsburgh. A world-wide exploration program was started shortly after World War II, he said, because of the concern over the future availability of iron ore for the expanding needs of the American iron and steel industry. This program has paid off in a number of large new mining areas.

Fairley described the chief iron ore discoveries and mining operations in South America, Africa and Canada, as well as the large-scale, concentrated attacks here in the United States on the problem of producing high-grade ore from taconite.

In describing the future outlook for the industry, he stated that within the last six months the chief executives of almost all major steel companies have made public statements to the effect that a tremendous expansion of steel-producing facilities will be necessary over the next 10 to 15-year period, which will call for a proportionate increase in iron ore production. "These last 10 years have been a period of rapid change, development and expansion in the production of iron ore," he concluded. "The next 10 years bid fair to be an era of even greater expansion, greater change and greater challenge."

Walter L. Rice, president of Reynolds Mining Corp., who was scheduled to present a review of light metals, was unavoidably detained in Europe. Rice's observations will be carried in the JOURNAL at a later date.

The size and diversity of the industrial minerals industry in the United States and Canada, in dollar value of product, in number of plants, in number of men employed, in the total of payrolls, far exceeds that of all the metals by a large margin, said Joseph L. Gillson, Development Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. He reviewed the advances made in each of the industrial minerals industries and reviewed the developments of importance undertaken to expand production.

"By far the largest segment of our industrial minerals is that embracing sand and gravel, stone and cement," he said, "which have directed great efforts in the past few years to increasing capacity in order to meet the tremendous growth of the building industry, and the ever-insistent demands of our highway programs." This great effort has also been expended by all other industrial mineral industries, he said, including those producing other building materials, the fertilizer industry, the sulphur industry, fluor-

spar, as well as other miscellaneous industrial mineral industries.

The continued expansion of the steel, aluminum and chemical industries, as well as our growth in population creating a need for more building construction and highways, will continue to place a strong demand on continued advances in the production of industrial minerals, he concluded.

Descriptions of each of the industrial and mining plants which were visited by many of those in attendance at the Convention on October 13 were presented by E. A. Lucas, vice-president, and Harold D. Bailey, manager, Mountain Pass Mine, Molybdenum Corp. of America; F. A. McGonigle, vice-president and general manager, Manganese, Inc., Three Kids Manganese Mine, Henderson; Robert F. Shurtz, director of research, Western Electrochemical Co., Henderson; and L. N. Grindell, manager, Nevada Operations, U. S. Lime Products Corp., Henderson.

IMPROVED MINING METHODS AND EQUIPMENT

IMPROVED Mining Methods and Equipment was the title of a Tuesday afternoon session chairmaned by A. C. Bigley, general manager, Western Mining Operations, The Anaconda Co. Roger V. Pierce, consulting engineer, Salt Lake City, Utah, presented a paper titled "New Equipment for Underground Mining." He described four new mining machines that could have a substantial and direct bearing on several important phases of present mining practices. Equipment described included the Cryderman shaft mucker for use in incline and vertical shafts; the Zeni large hydraulically controlled rotary drill, now drilling its third six-ft diameter hole for main line shaft service; San Francisco Chemical Company's multiple train car loader for drift work that allows the full 50-ton round to be mucked in the cars without switching a single car; and a large rotary continuous miner for drilling water-level tunnels or drift openings.

"New Equipment for Underground Mining" was the title of the next paper, given by Earl H. Miller, assistant resident manager, U. S. Potash Co. He outlined improvements in underground mining equipment made by the five producing potash companies during the past year. These include the installation of conveyor belt systems, the use of universal undercutters in place of shortwall cutters, and the increased use of hydraulic jumbo drills and diesel equipment. The Potash Co. of America has designed and built five new continuous mining machines in its own shops. Seven more

are being built on the same design but with greater capacity. International Minerals & Chemical Corp. has installed brake cars with street-car type magnetic brakes operated by the locomotive operator to increase hauling efficiency by making possible greater speed with heavier trips on downhill hauls.

C. A. Romano, resident manager, and Robert F. Love, mine superintendent, Intermountain Chemical Corp., teamed up to prepare a paper on "Trackless Mining of Trona." T. S. Bernatis, assistant mine superintendent for the company, presented the paper. The paper discussed the mining of trona from the underground deposit of the Intermountain Chemical Corp. in southwestern Wyoming. Mining methods including each face operation, ore haulage, ventilation, personnel and material handling, and power distribution were all covered in detail.

and smelter tailings for fill. Long rounds for blasting, millisecond blasting and a greatly overhauled scraping method have been put into effect. As a result of these changes, the Mountain Con has increased tonnage per stope, and decreased mining costs, with savings in explosives, timber and labor. A greatly improved ventilation system, despite 130° F. ground temperatures, has allowed concentrated mining over greater areas than ever before.

J. C. Kinnear, Jr., general manager, Nevada Mines Div., Kennecott Copper Corp., concluded the session with a paper entitled "Water Handling and Control at the Deep Ruth." Particular emphasis was placed on difficulties of shaft sinking as a result of encountering water in large volume. The Deep Ruth, or production shaft, Kinnear said, was flooded out by a 10,000 gpm flow at 525 ft from the collar. This

URANIUM EXPLORATION AND DEVELOPMENT

PHILLIP L. MERRITT, E. J. Longyear Co., presided over a session on Uranium Exploration and Development.

Ralph H. Wilpolt, Cullen Minerals Corp., in his review of exploration for uranium on the Colorado Plateau, emphasized that recent exploration has proved that the carnotite deposits are only a near surface oxidation product resulting from the weathering of uraninite and other dark uranium minerals. Uranium has been found in at least 20 formations ranging in age from Permian to Tertiary. During the last few years the Chinle has attained greater importance and is now rivaling the Morrison in productivity. Wilpolt reviewed the various theories for the origin of uranium and the principal techniques used in prospecting.

R. D. Lynn, The Anaconda Co., described the methods of drilling used by his company in the Grants area. Three types of drills have been utilized in exploration drilling, including the diamond core drill, the rotary type drill and the percussion wagon drill. He pointed out that each type of drill seems to have its particular place in the program, but the wire-line diamond core drill has been the most versatile and reliable exploration tool, particularly when good samples are required. Gamma ray logging has been helpful and economical under certain limited conditions and for specific purposes.

Rudolph A. Black, U. S. Geological Survey, described the geophysical procedures developed by the Survey in the exploration for sandstone-type uranium deposits in the Colorado Plateau. The geophysical program consists of airborne radioactivity surveys and aero-magnetic and gravity surveys to determine the structure of the basement rocks and their relationship to the Plateau deposits. Mr. Black explained that the use of geophysical methods as such are applicable particularly to indirect methods of prospecting.

Dr. R. Maurice Tripp, Tripp Research Corp., emphasized that both favorable physical and chemical conditions were necessary for the emplacement of a uranium deposit. Dr. Tripp felt that core drilling for deep potential ore bodies is feasible only if accompanied by carefully executed regional physical investigation followed by local geochemical and geological studies. He emphasized the occurrence of large uranium deposits on intersections of structural lineation patterns.

Sheldon P. Wimpfen, manager, Grand Junction Operations Office,



Operating sessions created intense interest

Bernatis concluded by stating that an active and progressive management and mine staff have dedicated themselves to continuous efforts toward new methods and improvements to existing facilities. A mine research crew is attached to the mine staff with an ever-increasing agenda of projects. These include a continuous study of adjacent rock formations and ground conditions, time studies, ventilation, and new equipment. He concluded by stating that the use of such a technical service department in mining is justified by the improved efficiencies, lower costs and greater safety of operation.

"Changes at Mountain Con Mine" was the title of a paper by V. D. O'Leary, mine superintendent, The Anaconda Co. O'Leary stated that a rock-bolting program has resulted in cutting out one-third of all excavation necessary in the past for required sill advance, and has practically eliminated timbering. At the same time a system of horizontal cut-and-fill stoping was introduced which made use of rock bolts for ground support

flow was controlled by extensive grouting which allowed further shaft sinking and the establishment of necessary pumping. In addition to pumping from within the shaft, two churn drill holes were drilled adjacent to the shaft, which penetrated the water-bearing zone located between 525 and 650 ft from the surface. By the end of October 1953 approximately 4600 gpm was being pumped from the shaft, coupled with 2000 gpm from the drill holes for a maximum of 6600 gpm. From this point de-watering and lowering of the water table was started. Drill-hole pumping ceased in December 1953 and water being pumped from within the shaft dropped from 4600 gpm in October 1953 to 1950 gpm in November 1954. Kinnear pointed out that in shaft sinking one should assume that he will be confronted by water in volume regardless of contrary facts at hand; should prospect for water with a large bore drill, and should wait until water is found before deciding to grout or pump; and that there is no substitute for actual exploration ahead of shaft sinking.

AEC, reviewed the programs for exploration, production, access roads, initial production bonus, off-Plateau procurement, and the processing of ores. He pointed out that a year ago there were perhaps 10 uranium deposits on the Plateau having an excess of 100,000 tons of reserves, whereas today there are some 25 deposits of this type, and at least a few could be measured in multiples of a million tons. The total tonnage of ore produced during the fiscal year 1955 was 43 percent greater than that produced during the previous fiscal year.

Mr. Wimpfen emphasized that the off-Plateau procurement program is considered principally as an exploration tool of the Commission. During the month of August 1955, uranium ores were milled at a rate of 375 percent of the 1952 milling rate. Four new mills are currently under construction; several old mills have increased their facilities and additional mills are being considered in eight localities.

Donald L. Everhart, Geological Advisor, AEC, described five broad uranium provinces in the world lying outside Communist domination. These were: (1) a broad area that encompasses granitic intrusives of Hercynian age in Western Europe, (2) the peripheral areas of the African shield, (3) the western and southern peripheries of the Canadian shield, (4) portions of the Cordillera of North and South America, from Alaska southward to Central Chile and Argentina, and (5) areas encompassing the granitic intrusives of Australia. Mr. Everhart stressed the point that a wide variety of geological ore types exist within each belt and that many favorable areas in these belts are still inadequately explored.

TARIFF PANEL

THE Tariff Panel on Wednesday morning was presided over by Senator Henry C. Dworshak (Rep., Idaho), who said that we are faced with a serious challenge today to formulate policies which will solve many of the problems currently plaguing the mining industry. "Under the Trade Agreements program there has been gradual erosion of our tariffs," he declared, "and instead of providing some measure of protection against low-cost production abroad, we face another conference in January at Geneva to negotiate further tariff reductions."

The Senator recalled that the U. S. Tariff Commission last year recommended to the President that rates of duty on lead and zinc be increased, and although the President did not follow the recommendation, he did recognize the need to provide relief and directed an increased stockpiling

program for these metals. "While such purchases have strengthened prices for lead and zinc," he asserted, "it is considered generally that this program was merely a temporary expedient."

He recalled that President Eisenhower, in his veto of a bill which would have expanded the domestic purchase program goals that was passed by Congress, emphasized again the necessity of long-range planning for the domestic mining industry.

"In a global war, stockpiles of minerals would soon be depleted," he concluded. "We must be prepared to develop domestic sources from which to replenish them. Industry leaders, the executive department and Congress are in complete agreement as to this objective, although so far we have failed to implement the specific policies."

Andrew Fletcher, president, St. Joseph Lead Co., stated that the basic problem facing the domestic mining industry, especially as it pertains to lead and zinc, is that metals can be produced cheaper outside the United States than inside.

The domestic production of metals is needed for the economy and defense of the Nation, he declared. He recalled that the President's Cabinet Committee on Mineral Policy recognized "that a strong, vigorous and efficient mining industry is essential to the long-term economic development of the United States," and made the point that market prices of lead and zinc must be at levels sufficient to maintain an adequate domestic mobilization base.

"I still believe that the best solution to offset the increased cost of production for lead, zinc and other similarly situated domestic metals," he concluded, "is a moderate stockpiling program when production is in excess of consumption, coupled with a moderate increase in tariff, as was recommended for lead and zinc on May 28, 1954, by the U. S. Tariff Commission, or an excise import tax, as in the case of copper, which would be suspended whenever the price was sufficient to permit the domestic industry to survive."

Rep. William A. Dawson (Rep., Utah) declared that Congress must get a tighter grip on its constitutional power to set tariff rates. In theory, he said, our Trade Agreements Act—providing as it does for peril point and escape clause procedures—is sound. In practice, however, these procedures have failed to protect large and important segments of our economy. He reviewed the action taken by the Tariff Commission and the President on a petition filed by the lead-zinc industry for increased tariff rates. "It occurs to me," he said, "that there is something fundamentally wrong in a procedure which puts the power to change an agreement in the

hands of the same agency which made it when it later turns out that the agreement was in error. If an industry can convince the Tariff Commission that it is being injured by an agreement negotiated by the President, that industry should have the right to have its case finally determined by someone who is not responsible for the situation in the first place." He declared that the agency most qualified to make this final determination is the Congress of the United States.

Representative John Rhodes (Rep., Ariz.) pointed out that we must have an adequate supply of metals of strategic character in time of war—which, in our system of free enterprise, must be brought about by the creation of a climate in which investors are willing to risk their capital. As the establishment of a sound and profitable mining industry is the only real guarantee that peacetime and wartime defense needs will be met, he declared, the mining industry must be afforded adequate tariff protection. No one wants to continue selling only to Government, he said, for "where an industry is subsidized, it produces only at the pleasure of the Government . . . it is not far removed from the situation which exists in Russia today. In that country, all means of production belong to the Government. . . . There is little difference between owning the means of production and controlling the means of production."

W. Lunsford Long, president, Tungsten Mining Corp., Warrenton, N. C., declared that the Congress made a general tariff revision in 1930 which provided what was then a real measure of protection for tungsten and manganese mining in the United States. He pointed out, however, that reductions of the manganese tariff under the Trade Agreements program coupled with inflated costs of production have resulted in what is today but small revenue for the Treasury and little if no protection for manganese. Although the tariff on tungsten is the same today as it was in 1930, he stated, it is too small to be of any real protective value to production in this country. "We have a lot of people apparently in this country and some with great influence in the Administration now in power in Washington," he said, "who believe that we should import our basic raw materials from abroad where they can be obtained temporarily in some instances cheaper than they can be produced in the United States under our wage scales and standard of living." This means that the time has come when all of us in the mining industry must unite to devise some means to keep going on in this country, he added.

Long expressed the belief that an adequate protective tariff should apply to the producers of our basic raw materials whether they come from the

farms, the forests or the mines, and that without a successful and profitable basic raw material industry, there can be no real enduring prosperity.

The Canadian point of view concerning United States tariff policy was expressed before the session by V. C. Wansbrough, managing director, Canadian Metal Mining Association, Toronto, Ontario. Canadian producers continue to be disturbed at the uncertainty which surrounds the tariff policy of the United States, he said, as some 50 percent of Canadian production of lead and zinc is marketed in this country. He stated that Canadian wage rates compare favorably with those of the United States and the Canadian dollar more than favorably with the United States dollar. "How your problem is to be solved is, in a sense, not our business," he concluded, "although Canadian producers may be greatly injured if increased tariffs are instituted. . . In the interest of North American solidarity, defense and peaceful expansion and progress, it is not only desirable but vital that any measures taken to regulate trade by either of our countries should be such as to achieve the desired result without sacrificing something far more valuable than lead and zinc."

Senator George W. Malone (Rep., Nev.) told the Convention delegates of his recent trip to Russia and pointed out that Russia is today becoming more and more self-sufficient industrially as well as agriculturally. He called for a return to a tariff program administered by the Tariff Commission as an agent of Congress, and criticized the Trade Agreements Act as being responsible for exposing our domestic markets to foreign low cost, low wage producers. He called for concerted action by the raw materials industries in opposing further tariff cuts during the negotiations to be held at Geneva, Switzerland, in January 1956.

TAXATION

CONTINUING the Wednesday morning session under the chairmanship of Senator Thomas E. Martin of Iowa, Government and industry officials highlighted some of the tax problems facing both the mining industry and those in Government charged with tax collection.

Chairman Martin in introducing the subject declared, "Last year's revision of the Internal Revenue Code did much toward removing inequities in our tax laws and many of the road blocks standing in the way of a strong, healthy mining industry were eliminated. However, much more needs to be done taxwise if this nation's mining industry is to continue to furnish the required raw materials for an ade-



A distinguished group at the barbecue

quate mobilization base and a strong national economy."

Internal Revenue Commissioner T. Coleman Andrews told the audience of the improved administration of our tax laws through the streamlining of the Internal Revenue Service. He pointed out, for instance, that delinquent account collections have increased threefold during the past 20 months with 20 percent less personnel engaged in this work. Andrews contrasted the high level of tax collections in this country with the low level of tax collections in many of those countries which are the recipients of American economic aid. The Commissioner also expressed the view that court sentences for tax evaders have been entirely too light and that many of the American people want to know why more tax evaders are not put in jail.

AMC Tax Committee Chairman H. B. Fernald spoke of the improvements that were made in the tax laws by the 1954 Code. He declared, however, that many amendments are needed to further simplify the tax laws and remove inequities. Fernald said that today our income tax problem is this: "To impose high taxes, payable in real money, on income, which is often more theory than reality, it has been necessary to distinguish between income to be taxed and capital not to be taxed; to determine exemptions or special allowances to be made in the public interest or in fairness to taxpayers; to avoid having the tax defeat itself, impair its revenue yield, discourage or prevent desired production, employment, transactions and activities for the general economic welfare; and to prevent general rules from having uniform application to variant circumstances or conditions to which they may not fairly and desirably be applied."

Ellsworth C. Alvord, AMC Tax Counsel, summarized the morning discussions and expressed the thanks of the mining industry to Commissioner Andrews for a job well done over the

past 21 months. Alvord predicted that the national income will increase next year and said there is a chance that the Government will operate in the black in 1956. He declared that there should be no tax reduction next year and that a surplus in the Treasury would be a good thing for a change. He called for further revision of the tax code to eliminate inequities.

OPEN PIT MINING

WEDNESDAY morning's session on Open Pit Mining was handled by Walter C. Lawson, general manager, Phelps Dodge Corp., Douglas, Ariz. Kenneth V. N. Harris, general mine foreman, Chino Mines Div., Kennecott Copper Corp., Santa Rita, N. M., co-authored a paper with G. J. Ballmer, superintendent of mines, on "Factors in Selection of Drill Hole Sizes at Chino." They told of the practice at Chino of using 12-in. blast holes with which appreciable savings were realized. Through use of large holes it is possible to save 33 percent in drilled feet of hole, considerable loading time of powder men, and one track shift out of four. Improved fragmentation is experienced along with better back break, resulting in 12 to 15 percent more rock from a single blast. Chino is now trying rotary drills for 12-in. holes and finds them satisfactory.

Hugh B. Lee, president, Maumee Collieries Co., Terre Haute, Ind., discussed dry rotary drilling and Akremite explosive. He traced the development of Akremite, pointing out its advantages and cost-cutting features.

"Company vs. Contract Truck Haulage" was the subject of papers by Joseph W. Wells, president, Wells Cargo, Inc., Las Vegas, Nev., and Everett L. Joppa, general manager of mines, Pickands Mather & Co., Duluth, Minn. Wells discussed the requisites of a good contractor and pointed out the various considerations in the decision

to contract work out. Joppa traced the history of contract haulage on the Mesabi Range in Minnesota. He pointed out conditions under which contracting is advantageous and other conditions where it is not. Reasons for the failure of some contractors were analyzed and problems posed by the contracting practice were discussed.

Joseph G. Ivy, section head, General Engineering, International Minerals & Chemical Corp., Chicago, Ill., gave a paper on "Planning a Radio System for Profits." He told of the first installation at Bartow, Fla., giving reasons for its success. He analyzed the principles most important in the successful planning of a radio system.

John A. Lentz, Jr., mine superintendent, New Cornelia Branch, Phelps Dodge Corp., Ajo, Ariz., discussed radio communications in the New Cornelia Pit. He enumerated the many savings and advantages in the use of radio and pointed out that, in his company, it received immediate acceptance and has been expanded ever since it was first installed. He described the maintenance of equipment as the major problem experienced.

In a talk illustrated with colored slides, J. B. Knaebel, manager, New Mexico Operations, The Anaconda Co., Grants, N. M., reviewed the developments of Anaconda's various uranium mines in historical sequence. These mines are now the backlog of production for the new Blue Water uranium plant. The slides also depicted the early, intermediate and present stages of construction of the plant and revealed some phases of its operation.

URANIUM MINING

WITH John J. Curzon, Exploration and Development Department, Climax Molybdenum Co., in the chair, the Uranium Mining session got off to a good start on Wednesday morning. First paper was "Mechanized Mining on the Colorado Plateau" presented by Harold B. Spencer, president of the Centennial Development Co. of Eureka, Utah. Spencer described the natural features and problems common to many of the highly mechanized uranium mines on the Plateau and showed how these influenced the choice of equipment used. He pointed out that mechanized mining will expand on the Colorado Plateau as more ore bodies amenable to the use of high output equipment are discovered. Noting that seldom has a better opportunity been given to mining men for applications of advanced methods, he predicted that newer methods and equipment yet to be developed will add to the economy and safety of uranium mining operations.

Harold Hilburn, chief engineer, Utex

Exploration Co., described the mining equipment in use at Utex by means of colored slides. A big step in mechanization of the Mi Vida Mine has been the adoption of the Gismo mining system. In connection with this phase of his talk he showed a series of slides showing the Gismo Jumbo, Gismo loading and transporting unit, and the Gismo transport riding atop a string of cars.

Otto A. Wiesley, chairman of the Utah State Industrial Commission, spoke on the responsibility of safety officials in uranium mine safety. He pointed out the hazards of uranium mining and related the action of the seven-state conference, called by Governor Lee of Utah, to study the situation and formulate safety standards. A later meeting in Grand Junction adopted a series of regulations prescribing adequate ventilation and maximum concentration of radon and immediate daughters of radon, with regulations and procedures for testing and recording test results to insure that excessive concentrations of these gases are controlled. Though the burden of these measures falls to the mine operators, Wiesley stated that the Utah Industrial Commission, recognizing the importance of the uranium industry, will strongly oppose arbitrary or unreasonable safety regulations. He pledged the cooperation of his agency and called for continued cooperation from the industry.

Miles P. Romney, manager of the Utah Mining Association, also spoke on Radon Gas Problems in Uranium Mining, and traced the history of the State regulations explained by Wiesley, analyzing the position of all parties concerned with uranium mine safety. He showed how the regulations had grown out of close cooperation between the mining men of seven western uranium producing states and state officials.

Earl B. Gillanders, managing director, Algom Uranium Mines, Ltd. of Toronto, Canada, gave a progress report on the Blind River district, particularly the operations of Algom Uranium Mines, Ltd. He pointed out that since the initial diamond drilling in May 1953, three major ore areas have been proved with indicated reserves of 150,000,000 tons grading better than 0.1 percent U_3O_8 . Algom Uranium, he said, is preparing two mines for a production of 3000 tpd each. The Quirke mine, where the shaft was started in July 1954, he said, is now developing underground and building a plant for production by July 1956. The schedule at the Nordic Mine is about six months behind that of the Quirke. It is planned to mine the ore in panels and later fill with mill sand, leaving only a few pillars unmined. Ore is to be treated by an acid leach system and U_3O_8 will be recovered by the ion exchange method.

GOVERNMENT MINERALS PROGRAMS

STOCKPILING and Government Mineral Programs was the subject of a panel discussion Wednesday afternoon, presided over by A. E. Millar, general manager, Yerington Mine, The Anaconda Co.

Assistant Secretary of Interior Felix E. Wormser said that the President's Advisory Committee on Minerals Policy has clarified national policies affecting the production and utilization of minerals and metals. The steps the committee urged the Government to take in order to maintain our security, he said, were to "enlarge the stockpile! Where domestic production is relied on as a component of the mobilization base, keep that production going! Establish clearly each agency's responsibility for preparedness measures! Consult industry! . . . As most of you know, this recommendation regarding stockpiling was promptly implemented by the inauguration of a program of purchases of lead and zinc of domestic origin. . . . The stockpile, however, is not a bottomless barrel. . . . Sooner or later, as these objectives are met, the purchase programs must be brought to an end."

In referring to the stocks of metals and minerals which may be acquired as a result of current barter transactions in exchange for surplus agricultural products, Wormser said there is no intention or likelihood of large quantities being acquired and then dumped on our domestic market.

The Office of Minerals Mobilization in the Department of Interior was established to undertake the task of analyzing, case by case, each strategic mineral and metal and recommending courses of action to strengthen the mobilization base. OMM, he said, has completed studies and has made recommendations to the Office of Defense Mobilization for several commodities.

The Department hopes to get substantial assistance from the mining industry in implementing the minerals policy set forth by the Cabinet Committee, Wormser said, through the 14 Advisory Committees representing 14 commodities which have been organized at the direction of Secretary McKay.

Referring to the Trade Agreements Extension Act, which authorizes the President to negotiate further tariff reductions, he declared, "I do not believe that this particular authorization is likely to have any profound effect upon the mining industry as a whole. Generally speaking, the duties on metals and minerals are already extremely low, in fact many ores and concentrates are on the free list. I believe that in forthcoming negotiations the mining industry stands to

gain through reductions made by foreign countries in their tariffs on products containing large quantities of domestically mined materials."

Speaking of the requests made to the Office of Defense Mobilization to reduce the volume of fluorspar and petroleum imports, Wormser stated that "we must recognize that the problem of wartime minerals supply and the problem of providing minerals for a growing economy are of different dimensions. The Federal Government must do all necessary for security—its influence on the play of economic forces must be held to a reasonable minimum." In this regard, he said the President is authorized to take such action as he deems necessary to adjust imports to a level that will not impair the national security.

In conclusion, Wormser said that although the Cabinet Committee report establishes broad benchmarks within which to work, it throws back at the Government most of the detailed problems with which it has been grappling, as it recognizes that every mineral is different and that each has to be dealt with separately.

Otto Herres, vice-president, Combined Metals Reduction Co., discussed the effects of the lead-zinc stockpiling program and observed that although it has been temporarily helpful to industry, it has not accomplished the intended purpose of adequately benefiting domestic mines, while foreign producers have prospered under the program. "It is plainly evident that U. S. stockpiling encourages the expansion of foreign production," he declared, "and in the absence of restrictions, it brings us added imports to the extent that it increases prices to a more adequate level. Thus it defeats its purpose of providing relief for our mines." The logical policy, he said, would be to restrict excess imports when they are offered at prices that will destroy those segments of our mining industry which produce the major portion of our needs.

Hewitt S. West, Jr., executive vice-president, Manganese, Inc., called upon the Administration to establish a minerals program which will keep alive the domestic mining of tungsten and manganese, along with all the other strategic and critical metals. The report of the Cabinet Committee on Mineral Policy, he said, apparently means that the metal mining industry in this country is to be kept alive in all of its divisions and that the industry can look forward to the future with hope.

Fay I. Bristol, president, Bristol Silica Co., declared that we would have a lot of manganese, chrome and tungsten if the price reflected the difference in labor costs from foreign producers. He called for a reasonable tariff on these three minerals "the proceeds of which would be paid directly to producers on their proportionate production of the contained

metal. . . ." He pointed out that the producers of the three minerals will be practically out of business within a year unless a long-term program is forthcoming.

Discussing the problems connected with the domestic production of antimony, James P. Bradley, vice-president, Bradley Mining Co., reported that our current production is at the rate of seven percent of normal peacetime consumption and is equivalent to only two percent of our estimated wartime needs. He said the development of the domestic antimony industry has been held back by the lack of tariff protection, which has forced the United States to become dependent upon foreign sources for the greater part of its primary antimony requirements.

Bradley pointed out that there may be difficulties in obtaining foreign supplies in the event of an emergency, and called upon the Government to encourage the survival of the domestic mining and smelting industries "by means of higher tariffs, import quotas and by giving preference to antimony of domestic origin in stockpile buying."

Many people actively engaged in mining are becoming increasingly discouraged with the outlook for mining in the United States, reported S. H. Williston, vice-president, Cordero Min-

Iowa) complimented the Administration for its refusal to participate in the work of the United Nations Commission on International Commodity Trade, as well as for its rejection of a proposed agreement dealing with so-called restricted practices. Senator Martin referred to testimony received by the Senate Judiciary Subcommittee on Anti-trust Monopoly during hearings recently concluded, and revealed that there is still active support within this country for the establishment of a committee within the United Nations which would revive international agreements on commodity controls and restrictive business practices.

The outlook for the Defense Minerals Exploration Program was discussed by C. O. Mittendorf, Administrator, Defense Minerals Exploration Administration, Department of the Interior. As mines of the future must be planned today, he declared, it is essential that a broad and continuing program of exploration be vigorously pursued.

The best yardstick with which to measure the DMEA program, Mittendorf said, is the evaluation of reserves developed under the program. So far, he reported, when the costs of all the unsuccessful projects are included, for each \$1,000,000 invested by the Gov-



Tariff policies under discussion by experts

ing Co. "If the general level of tariffs on an ad valorem basis that were in effect in 1939 were in effect now," he declared, "the domestic mining industry would have relatively few problems. The fact that through inflation and through actual tariff cuts these levels have been reduced from the neighborhood of 40 percent to levels uniformly below 10 percent, certainly indicates that the difficulties of the domestic mining industry can be placed squarely on the door step of Washington, under both Democratic and Republican Administrations."

"As the causes of this mining uncertainty are almost all derived from Washington," he concluded, "the cure, regrettable as it may be, must come, if at all, from the same source."

Senator Thomas E. Martin (Rep.,

ernment, more than \$32,000,000 worth of potential new mineral resources has resulted. "The total money and effort expended together by Government and industry in mineral exploration must be considered a sound economic investment in the future of America," he stated. The fact that DMEA is effective in stimulating exploration, he said, is well illustrated by the number of applications received by the Agency. He said that 490 applications had been received during the past 12 months. "So long as this high interest persists, so long as we continue to evaluate all projects impartially on sound geologic and engineering principles—and so long as the work is diligently performed—then I believe the worthwhileness of the program is definitely assured," he concluded.

AEC POLICIES

WEDNESDAY afternoon's session on uranium was devoted to "AEC Policies—Outlook for the Industry." Merritt K. Ruddock, vice-president, Cal Uranium Co., Moab, Utah, presided.

Senator Clinton P. Anderson (Dem., N. M.), Chairman of the Joint Committee on Atomic Energy, spoke on the subject "Wanted: A Long Range Policy for the Uranium Mining Industry." He cited apprehension within the industry as to what future Government policies would be, and traced the historical background, summing up industry's problem with the questions, "How long will the military market for uranium ores hold up—how rapidly will the civilian power market grow? Can there be a slow, orderly and healthy transition from one market to the other?"

For the years immediately ahead, he said, we will need all the uranium ore we can get if we are to meet the atomic weapons goal set forth by our defense planners. Speaking as a layman in military matters, he opined, "I believe that our output of nuclear weapons

He said that the Atomic Energy Commission, "by next spring should issue a formal Government statement explaining if it wants uranium and in what years and at what prices." At some length, he presented the reasons why a practical hydrogen reactor is too far in the future to compete with the uranium industry for perhaps a century.

"A Businessman's Observations on the Geneva Conference" by Ward M. Canaday, president Overland Corp., Toledo, Ohio, was read in his absence. Canaday's paper was a brilliant descriptive record of proceedings at Geneva. He was impressed by the efficiency with which the conference was conducted. He cited the many phases of the Atomic Energy programs of the world and told of the many exhibits and demonstrations put on there. Canaday is hopeful that through the efforts of the Geneva Conference we are now at the threshold of important advances to an atomic age.

"Outlook for Uranium Development and Production" was discussed on a panel by R. G. Sullivan, vice-president, Minerals Engineering Co., Grand Junction, Hon. Stephen L. R. McNichols, Lieutenant Governor of Colorado,

large corporation and the taxpayer. He asked for an AEC stockpiling program to take high-lime ores until additional milling facilities can be brought into the Colorado Plateau milling area.

Kennedy dealt with the plight of the uranium producers and the present insecurity of the whole industry in the light of the 1962 expiration date of the uranium purchase program. He told of the large stake of the miner with big investments in uranium mining and questioned whether that miner was being treated fairly.

Brewster characterized the history of the financing of small and intermediate uranium enterprise thus far as "a sorry tale." He said that hogfishness on the part of many underwriters and stock dealers; dishonesty among some promoters; a lack of professional integrity by some geologists, engineers, and professors, and deliberately fraudulent promotions have combined "to smear almost all such projects with the brush of the fakers" and has been responsible for the debacle of the so-called "penny shares."

He expressed the opinion that this situation has rendered the financing of all but "sure shots" far more difficult than circumstances justify. He emphasized that the financing of the large ore developments has not been too difficult because of the financial status of individuals and organizations involved, but there have been complaints that bankers and substantial investment houses have not participated.

Brewster pointed out that the financing of treatment mills has been carefully protected from fraud by the AEC and the financing organizations. A similar situation exists with respect to the financing of atomic power projects. He said the future financing of uranium mining deserves careful consideration of the danger of the Government deserting its buying program and the industry becoming commercially competitive. He expressed the belief that the "fine print" of the Atomic Energy Act would permit the Government to "desert the uranium mining industry before 1962 were it to determine that it possessed too much uranium or that it would turn to thorium to solve the fusion problems quicker than it expected."

Dean A. J. Eardley, University of Utah, Salt Lake City, presented an economic study of domestic uranium production and imports projected through 1965, together with estimates of possible military and civilian consumption. He predicted that the United States will reach the peak of exploration activity this year and that the production peak will come in 1958. His estimates indicated that the stockpile accumulation through 1955 will satisfy all our war needs. Eardley outlined his views as to consumption rates for power, comfort heat, medical, agricultural, metallurgical, biological and general research purposes,



Meeting of State Mining Association officials

may remain on a high level for an indefinite period to come." He stressed that tactical applications of atomic weapons threatened to overshadow the strategic applications, citing atomic ack-ack, the atomic submarine, and atomic propulsion of naval vessels and aircraft.

Tracing the world population growth and economic developments, Anderson quoted the experts as predicting "by the year 2000 the world will be consuming annually five times as much energy as it is today." The necessity of learning to produce atomic power at a reasonable price was emphasized. Senator Anderson ventured to guess that estimates of uranium oxide requirements between 1975 and 1980 are too conservative, that the free world will need sizable quantities of uranium for civilian power well before 1975, that we do not anticipate how rapidly the price of electricity from the atom will go down, and that the demand for atomic energy, particularly in propulsion devices, will go up.

G. R. Kennedy, special representative, Kerr-McGee Oil Industries, Inc., Oklahoma City, and Burt R. Brewster, editor and publisher, *Mining and Contracting Review*, Salt Lake City. All of these men referred to the question of what will happen to the uranium industry after 1962. Sullivan expressed the view that the excess of uranium ore will disappear in 12 months. He also predicted that better exploration methods will be developed.

Lt. Governor McNichols, while leaving the technical factors to the engineers, discussed in detail some of the human factors in the uranium mining industry. He cited the conflicts of industrial interests and unfairly controlled markets. He asked questions about the price structure for uranium and associated minerals and noted the present policy of wasting the contained vanadium. He called for the Government and the industry to get together and set realistic prices for the protection of the small producer and at the same time give a "fair shake" to the

and forecast that at the most hopeful rate of reactor expansion the U. S. will use only a fraction of the amount of uranium that we will accumulate over the next ten years. He expressed the view that uranium power generation may not make any substantial inroads into the markets already established by the coal, oil, gas and hydro-electric industries.

INDUSTRIAL MINERALS

ANOTHER important session, Industrial Minerals, was held Wednesday afternoon with H. L. Waldthausen, Jr., works manager, Blue Diamond Corp., as chairman. First speaker was Frank L. Marsh, assistant to the president, Lauhoff Grain Co. His paper was entitled "The Manufacture of Gypsum Products." In it he outlined the present uses of gypsum and told how important it is to our way of life. Marsh said that there are 10 companies now producing gypsum products and seven new gypsum plants are in the process of being built.

Next on the program was Wilson C. Hanna, vice-president in charge of technical development, California Portland Cement Co., Clinton, Calif., who described his company's new \$12,000,000 cement plant at Creal, Calif. A full description was given of the plant flow sheet and the conclusion was expressed that the long kilns that are going to be used at Creal will ultimately allow the reduction of fuel consumption to approximately 800 Btu per barrel of clinker produced.

Final speaker at the Industrial Minerals session was O. J. Scherer, consulting engineer, Las Vegas, Nev., who spoke on "Nevada Perlite." Scherer traced the development of perlite to its present importance in the industrial minerals field. He said that of the 230,000 tons now being produced annually, 80 percent goes into plaster. Based on statistics over the past five

to seven years, Hanna said we can expect a 10 to 15 percent increase in perlite production annually. However, the great technical advances made in lightweight aggregate production and the demand for perlite in lightweight aggregates may drastically increase this demand. Scherer concluded by anticipating that in three years' time 40 percent of the perlite production will go into manufacture of plaster, 40 percent into lightweight aggregate, and 20 percent into miscellaneous items.

GOLD, SILVER AND MONETARY POLICY

DONALD H. McLAUGHLIN, president of Homestake Mining Co., lent the convention his dignity and prestige on Wednesday afternoon by presiding over the gold and silver conference.

Ray B. Wiser, president of Walkeng Mining Co., in a carefully prepared and thoughtful paper, reviewed current monetary policies with regard to gold and their bearing on the value of the dollar and on international trade. Their impact on critical aspects of the domestic economy, such as the agricultural problem, was pointed out, and the futility and dangers of relying upon the money managers to solve them were emphasized. He stated his concept of a sound monetary policy in accordance with which the dollar would be again established on a fully convertible gold basis that reflected its current standing as measured by today's price levels. Few papers in recent years have presented the facts more clearly or have argued more effectively for procedures that most miners feel are essential if inflation is to be checked and stable money regained.

Senator Alan Bible (Dem., Nev.) presented an excellent paper in which he stressed the importance of silver in our monetary system, as well as

expressed his convictions that the gold standard should be restored with convertibility at a fixed price that reflects the current depreciation of the paper dollar. The good case he made for hard money won appreciative applause and much favorable comment.

Bible also pointed out that at the last session of Congress a determined drive was initiated by some Senators, primarily from consuming areas, to bring about repeal of existing silver legislation. Western Senators, he said, had stepped in to stop this drive by demanding adequate time at the forthcoming session for opponents of the repeal measure to present their case.

Señor Ingeniero Gustavo P. Serrano, president of the Mining Chamber of Mexico, spoke on the relation of silver to the economy of Mexico. He reviewed the dominant role silver has played in the development of the country since the earliest years of the Conquest and emphasized the vital importance to Mexico and to other silver producing countries of policies that would maintain a stable output and a prosperous mining industry based on silver-bearing ores.

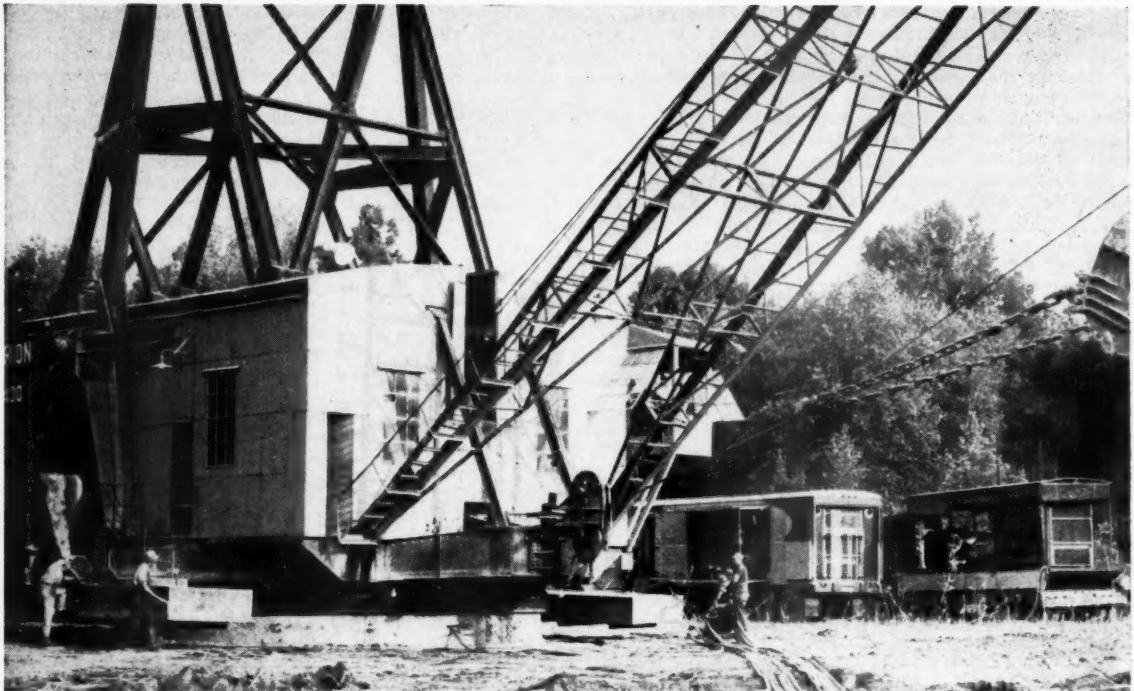
TAX CONFERENCE

FOLLOWING the close of the Convention a Tax Conference under the Chairmanship of H. B. Fernald discussed many of the technical tax problems facing the mining industry. Reports were made by Chairmen of Subcommittees on Definition of Property, Depletion of Waste or Residues, Exploration and Development, Gross Income from the Property, Accounting Methods, and Foreign Income.

Delbert W. Williams, Chief of the Natural Resources Section, Internal Revenue Service, participated in the discussions and contributed helpful information to the more than 75 tax specialists in attendance.



On a convention field trip many visited the famous rare earths operations of Molybdenum Corporation of America at Mountain Pass, Calif.



Saxton Coal Corporation's 560-ton walking dragline just over half way on its seven-mile journey

Moving Day at an Indiana Coal Mine

Thirteen-yd Dragline Averages One Mile per Day in Cross-Country Move to New Mine Site

THE Saxton Coal Corp. of Petersburg, Ind., successfully moved a 560-ton Marion 7400 walking draglines seven miles from Somerville, Ind., to a new strip mine area near Oakland City, Ind. It is believed to be the first time that a dragline of this size has been moved this far with this kind of power in a period of only seven days. The unit is equipped with a 13½-cu yd bucket.

Initial planning for the big move began over a year and a half ago. Three methods of getting the unit moved were available: (1) It could be disassembled and then reassembled at the new area. This method would cost approximately \$60,000 and take three months. (2) Utility power could be used with men erecting the power lines, taking them down and erecting them again. This method would cost about \$45,000 and take 30 days. (3) Mobile power could be used which would cost about \$30,000 and would take less time.

Pick Mobile Power

About a year ago executives from Saxton were attending a meeting of the Open Pit Mining Association in Hibbing, Minn. While there, they became interested in the possibility of using mobile diesel-electric sets to furnish power for the move. Further investigation proved the feasibility of the idea and the company went ahead with plans to move the dragline with mobile power. For the move, two Caterpillar D-397 electric sets were used, each capable of delivering 350 kw. After the mobile electric units were arranged for, right-of-way easements across private property had to be negotiated. Working permits also had to be required for the railroad power line crossing. It took about six months to obtain these.

Payments for easements across private property were decided upon on a per acre basis. Crop damage was considered as a separate item and

was paid for after the dragline crossed the property. Most of the time a 100-ft swath was used for the passage. Damage to fences could be handled in two ways. The farmer could repair his own fences and keep a record of his time and materials and be reimbursed; or a temporary fence could be set up and a permanent one erected by the coal company after the dragline reached its destination. Usually the farmer selected the latter method.

Begin the Move

With preparations completed, the dragline was ready to be moved from the old area near Somerville, Ind. The first obstacle was a 69,000-v power line owned by the Southern Indiana Gas & Electric Co. This line could only be crossed on Sunday because no alternate line was available which could handle the existing week day load. After this crossing, only a short distance was covered before state highway No. 57 was encountered.

For the highway crossings, assistance was received from the State Highway Patrol. All traffic was detoured. To protect this asphalt highway, five ft of dirt was heaped upon the road by the dragline. Two crawler mounted tractors were used to dress up this covering and the immediate approaches.

A second state highway, No. 64, was crossed in a similar manner. All asphalt roads received a protective covering. Other county gravel roads

were crossed by building approaches only.

For crossing the railroads the tracks and ties were removed. It was necessary to remove two sections of each track. This work was done by the respective railroad companies. The New York Central was crossed two different places and the Algiers, Winslow and Western Railroad was crossed once. This latter road is one of the smallest roads in existence—it is 16 miles long and serves only strip mining companies.

Neither road has any passenger train service. The New York Central has ten freights a day and the Algiers, Winslow and Western has about five freights. To cross these roads no protective covering was used. However, approaches were built by the dragline and the crawler mounted tractors.

Power lines were taken down by the power company crews. Lines of the Southern Indiana Gas & Electric Co. and Public Service Company of Indiana were crossed. All of these lines were of 33,000 v except the first line encountered which had 69,000 v.

In all a total of seven roads, five power lines and three railroads were crossed. No special charges were levied by these concerns. Only charges for time and labor were assessed.

One thousand ft of power cable was used to walk the dragline. This allowed the unit to travel 2000 ft before the mobile electric sets would have to unhook and move. They would reset 1000 ft beyond the dragline.

Work Around the Clock

Whenever possible the dragline traveled around the clock. However, when highways, railroads, or power lines were reached, night travel would cease. On one occasion a railroad was neared late Saturday night and all operations ceased until the following Monday. To facilitate this round the clock operation took three shifts of six men each. This did not include the Caterpillar personnel, which had charge of the electric sets, or the supervisory personnel of Saxton.

The most difficult obstacles were the state highways, the bottom land and the South Fork of the Patoka River. County roads, railroads and power lines did not offer too difficult a problem.

The lack of solid footing under some of the bottom land was of great concern. Tests in some areas indicated nothing but sand and muck down to 75 ft. In one spot of this low terrain the sod started to ball up in front of the dragline's base. It took approximately one hour to negotiate this spot with the help of the crawler mounted tractors. In similar areas which followed, the sod was removed to prevent a recurrence. There was



The two mobile electric sets were advanced every 2000 ft



Two bulldozers prepare an earth pad to protect State Highway No. 64 for the crossing of the 13½-yd dragline



Rails and ties were removed before the dragline crossed a railroad track. Approaches had to be built to the road bed but no earth was dumped into the bed itself



Crossing the Algiers, Winslow and Western Railway

always the danger in areas such as this that the dragline would bury itself.

A River Crossing

Crossing the South Fork of the Patoka River presented the greatest potential risk. This river is approximately 50 ft wide and 12 ft deep. Although the flow is not great there was the possibility of a heavy rain. During rains this stream becomes a torrent.

Instead of laying tubes in the stream bottom it was decided to build a fill across the river. This was done after the unit arrived at the river. The crossing was not prepared earlier in order to keep the fill as dry as possible. Approximately 300 cu yd of dirt were dug by the dragline to make the fill. A diversion canal was also built to allow the water to pass around the unit and the fill. As it was, the dragline tub sank into the fill as much as a foot. Needless to say if trouble had been experienced in

this spot the journey of the Marion 7400 would probably have ceased, and the disassembling job begun.

After crossing the Patoka the dragline dug out the channel. In the meanwhile the crawler mounted tractors were busy clearing land on ahead and skimming the top soil from the soft bottom land.

Several times the dragline's route passed over the little and big-inch pipelines. It also passed over several waterlines. Before passing over these lines a protective cover of earth was laid over the area. The amount of fill used varied according to the depth of these lines.

Land Restoration

To keep the friendly relations of the landowners along the route a second bulldozer and a dragline were rented to replace damaged terrain to its former state. In many cases the farmer's land was improved.

The Marion 7400 averaged approximately 400 ft an hour in good going.

With each step it advanced about six ft. During this seven-mile trip the 560-ton unit was lifted up and down approximately 7400 times. Good weather prevailed throughout the journey and only minor troubles occurred. Considering the length of the route, and the hazards encountered, the operation progressed very well. Management of Saxton Coal Corp. is high in its praise of using mobile power units on the seven-mile move. In fact Bernard Youngs, vice-president of the company states that, "Mobile power is the only way to move one of these machines."

The mobile electric sets supplied adequate power for the dragline's operations. While walking the peak load was 560 kw, and 600-kw peak when digging (this was in heavy material). More power was required when the dragline traveled downhill than uphill. Paradoxical perhaps, but the unit in downhill operation had to be lifted against the grade. Voltage at the electric sets never dropped more than five percent during peak loads; this did not include line loss in the 1000 ft of power cable.

The New Mine

The new strip mine area of Saxton's will be located only a short distance from Oakland City, Ind. This town of 3500 population was extremely interested in the progress of the dragline. During the evening, the local people would come out to watch the progress. Moreover, when the unit was passing through corn fields, roasting ears could be had merely for the picking.

The new strip area near Oakland City is expected to produce slightly more than 200,000 tons annually.

Coal which is mined from the new area will be shipped to the tipples located at the old area near Somerville, Ind.



Three railroads, seven roads and five power lines were crossed



Same equipment—different jobs

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Under normal conditions there is one best size and type of Red-Strand rope for every wire rope using machine. This is the one you use day in and day out on your routine work.

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struction will probably absorb shocks better and last much longer than ordinary types.

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General view of Chino pit

Factors in Selection of Drill Hole Size at Chino

Open Pit Mine with Rail Haulage Proves Effectiveness of Large Diameter Blast Drill Holes

By G. J. BALLMER and K. V. N. HARRIS

Superintendent of Mines

Chino Mines Division
Kennecott Copper Corp.

General Mine Foreman

THE open pit mine of the Chino Mines Division of the Kennecott Copper Corporation is at Santa Rita, N. M., 70 miles north of the Mexican border and 60 miles east of the Arizona state line, at an elevation of approximately 6300 ft above sea level.

This mine is one of the oldest in the southwest with a history dating back to 1800. The copper deposits were known to the early Spaniards who at times worked these mines with slave labor shipping the copper by mule and burro train to Chihuahua and Mexico City for coinage purposes. After the area in which the mine is located became part of the United States, title was perfected under United States mining laws by searching out the heirs of the original owners in various parts of the world and purchasing their portions of the property.

Open Pit Started 1910

In the early days all mining was done by underground methods and shafts were comparatively shallow, rarely exceeding 120 ft in depth until the late nineties and early nineteen hundreds when the Santa Rita Mining Company sank several deeper shafts to a depth of approximately 350 ft. From 1906 to 1908 an intensive sampling campaign was instituted and a large low grade ore body outlined. In 1909 the Chino Copper Company was formed and open pit operations using steam shovels, locomotives and railroad cars were started in 1910.

The pit is roughly circular in shape and approximately 7000 ft in diameter. An island, formerly a townsite, rises in the middle of the mining area. The ore body boundaries are extreme-

ly irregular. The main ore mineral is chalcocite which occurs in a highly fractured and altered mass of granodiorite.

A series of horizontal benches ranging in elevation from 6600 down to 5815 ft above sea level is gradually being pushed back to the north, east and southwest. The broken rock is loaded by large electric shovels directly into 70- and 90-ton Santa Fe railroad cars and the waste into 30- and 40-yd side air dump cars. All material loaded has been blasted from 12-in. vertical drill holes.

Blasting Practices

Some difficulty is encountered in blasting at Chino Mines because of the lack of uniformity of the rock. Much of the material is extremely hard and siliceous, while other is somewhat friable and rather easily broken. A high strength and comparatively high speed powder, which we feel is ideal, is used to break this rock in place. Apache Powder Company's free running ammonium nitrate bag powder, 70 percent strength, is used in dry holes but where water is present, a semi-gel powder Amogel, in 50-lb cartridges, 10 in. x 16 in., is employed. This powder is of 60 percent strength and may be intraloaded with the free running bag powder with uniform results.

In a pit where railroad haulage is employed blasting presents problems that need little consideration in truck

haulage pits. For instance, when a shovel cleans up a cut there is approximately 55 ft of space between the track and the toe of the bank. This area should be filled with broken material by a bank shot, so controlled that it will not be necessary to remove the track in front of the blast, and also shot hard enough to thoroughly fragment the ground but still completely fill the area to permit a full shovel cut. After considerable experimentation the powder foreman and interested personnel at Chino devised a blasting system which generally fills this area between the toe and the track, thoroughly breaks the ground, and reaches back far enough so that after the first shovel cut the track may be shifted 45 ft and another full cut taken to clean up all the broken ground and leave a solid bank ready for blasting again. Thus at this mine two full shovel cuts are obtained with each track shift and with each row of bank holes blasted. This system works admirably for Chino but may not be particularly advantageous to a mine using truck haulage.

Drill holes are spaced along the edge of the bank, so far as possible, in tangents and at varying distances both from the crest and from each other. These holes are drilled approximately six ft below grade depending entirely upon the bank height and the nature of the ground. The banks vary in height from 42 to 50 ft.

Hole Sizes Increased

In the early days of the mine churn drills employing three in. and 4½-in. bits were used. Beginning in 1937



Pit view shows results of a blast that put rock within easy reach of track

new churn drills using six-in. bits were obtained. A great deal of difficulty was encountered in thoroughly breaking the ground and also in chambering these holes sufficiently to introduce enough powder. Experimental nine-in. holes were drilled, therefore, and the results were so far superior that all of the drills were converted to use nine-in. bits. About this time the matter of fragmentation of more material with one blast was studied and several experimental shots using multiple rows of nine-in. holes

were designed and blasted. These did not prove too satisfactory because the back-break was unpredictable and in order to properly shoot these the track in front of the blast had to be removed. A large churn drill became available at this time and it was decided to try this as a blast hole machine. Curiously enough when this drill was equipped with a standard string of nine-in. tools it did not drill as much as the regular machines, but when a heavier stem was attached it outdrilled the lighter machines. Because of the availability of this drill capable of drilling with heavier tools it was decided about the middle of 1946 to drill some 12-in. blast holes.

12-in. Holes Studied

The 9-in. holes were spaced roughly ten ft from the crest and about 16 ft apart along the bench. Calculations indicating the number of cu yd per hole and the volume of powder per drill hole were made to adjust these 12-in. holes to the nine-in. hole pattern. In making these calculations the basic consideration of tons of rock broken per lb of powder was allowed to remain the same. One of the important measurements in blasting calculations is the powder rise in the hole. A 12-in. shot was designed to get enough powder in the holes to break the ground thoroughly and still drill only enough holes to properly contain the powder. From previous experience with 9-in. holes it was decided that a toe load to bank height factor of 0.8 to 0.85 would be utilized and it was also noted that sufficient powder could be placed in the holes so their horizontal spacing could be equal to one-half the bank height. With the above factors taken into ac-



This equipment is used to drill 12-in. blast holes

count an experimental shot was laid out on the 6026 bench. This bench was chosen because it was made up of various types of rock. In the first experimental shot a series of 12-in. holes was drilled about in the middle of the bench and 9-in. holes completed the shot on both ends of the bench. During the loading operations it was discovered that 12-in. holes could be loaded a great deal faster and easier than 9-in. holes thus an additional saving of time could be effected. There were plenty of observers on hand to watch the shot and it was impossible to detect the difference between the 9-in. and 12-in. holes at the moment of blasting. The blasted bank was carefully inspected after the blast and no difference was noted in fragmentation, nor in heave, but there was some difference in the back-break, the 12-in. holes having broken back slightly further than the 9-in. holes on either side. When this broken material was completely loaded hard ribs were found on the west end of the shot in the area covered by 9-in. holes and at the junction of the 9-in. and 12-in. holes. The remainder of the shot dug well.

In the second shot the 12-in. holes were located in the hard rock on the west end of the bench and extended well past the middle with the 9-in. holes completing the shot. After blasting, the ground was very well broken and dug well with the exception of one small area at the juncture of ore and waste in that portion of the bench drilled with 12-in. holes. The third experimental shot on this bench was drilled entirely with 12-in. holes and the 42-T rig drilled the entire bench while the shovel was loading out the previous shot. This turned out to be an excellent shot and the shovel encountered no difficulty.

Results Favorable

These three experimental shots showed that:

(A) A very substantial saving in

TABLE I—COMPARISON OF 9-IN. SHOT WITH 12-IN. SHOT

	9-in. Holes	12-In. Holes
Lengths of shot	880 ft	950 ft
Number of holes	54	38
Average depth	57 ft	56 ft
Total ft of drilling	3,086	2,128
Average bank height	48 ft	50 ft
Average spacing	16.3 ft	25 ft
Average toe load	33 ft	45 ft
Average crest	10 ft	15 ft
Ratio toe to bank height	.675	.9
Average burden per hole—cu yd	950	1,956
Average burden per ft of hole—cu yd	16.6	35
Total burden—cu yd	51,373	74,393
Total burden—tons	102,746	148,786
Total powder loaded (cases)	481	803
Tons burden per lb powder	4.27	3.7
Depth to top of powder (ft stemming)	36.0	40.5
Average thickness of powder column	21.0 ft	15.5 ft
Average rise in ft per case of powder	2.38	.73
Average number of cases per hole	8.9	21.1

TABLE II

	9-in. Holes	12-In. Holes
Length of shot	744 ft	712 ft
Height of bank, ft	45.1	46.0
Hole spacing, ft	16.9	24.6
Total holes drilled	44	29
Total ft drilled	2,249	1,508
Average toe load, ft	35.4	39.6
Total tons burden	93,638	102,388
Total powder loaded, lb	19,500	22,250
Tons blasted per lb of powder	4.80	4.60
Tons blasted per ft drilled	41.64	67.90
Ratio—toe to bank height	.785	.861

the amount of churn drill footage necessary to blast down a bench could be made by using 12-in. holes. This saving averages about 33 percent;

(B) A saving in time is effected in loading the holes. There are fewer holes to load and the larger diameter holes load easier and faster;

(C) A saving in track work is effected since it was not necessary to remove the track for blasting;

(D) It appears that the greater concentration of the powder causes a mass effect which gives better fragmentation, less "heave" and greater "back-break."

Fragmentation in place with little heave occurs partly as a result of the use of a fast powder, but the use of larger volumes of powder in fewer areas seems to give greater effectiveness and better control in the blasting.

In these experimental shots, particularly the first two, not as much attention was paid to filling the area between the toe and the track as was later done. On the first shot there was from eight to twelve feet of room between the shot down material and the track, in other words, all of the available room for blasted material was not completely utilized. In the third shot which consisted of 12-in. holes the distance from the crest was increased an additional four ft. This increased the burden, broke more rock and more completely filled the available space. Subsequently several more 12-in. hole shots were blasted in various portions of the pit. A listing of comparable shots, both in hard rock, one a 9-in. shot and another a 12-in. shot, is given in Table I.

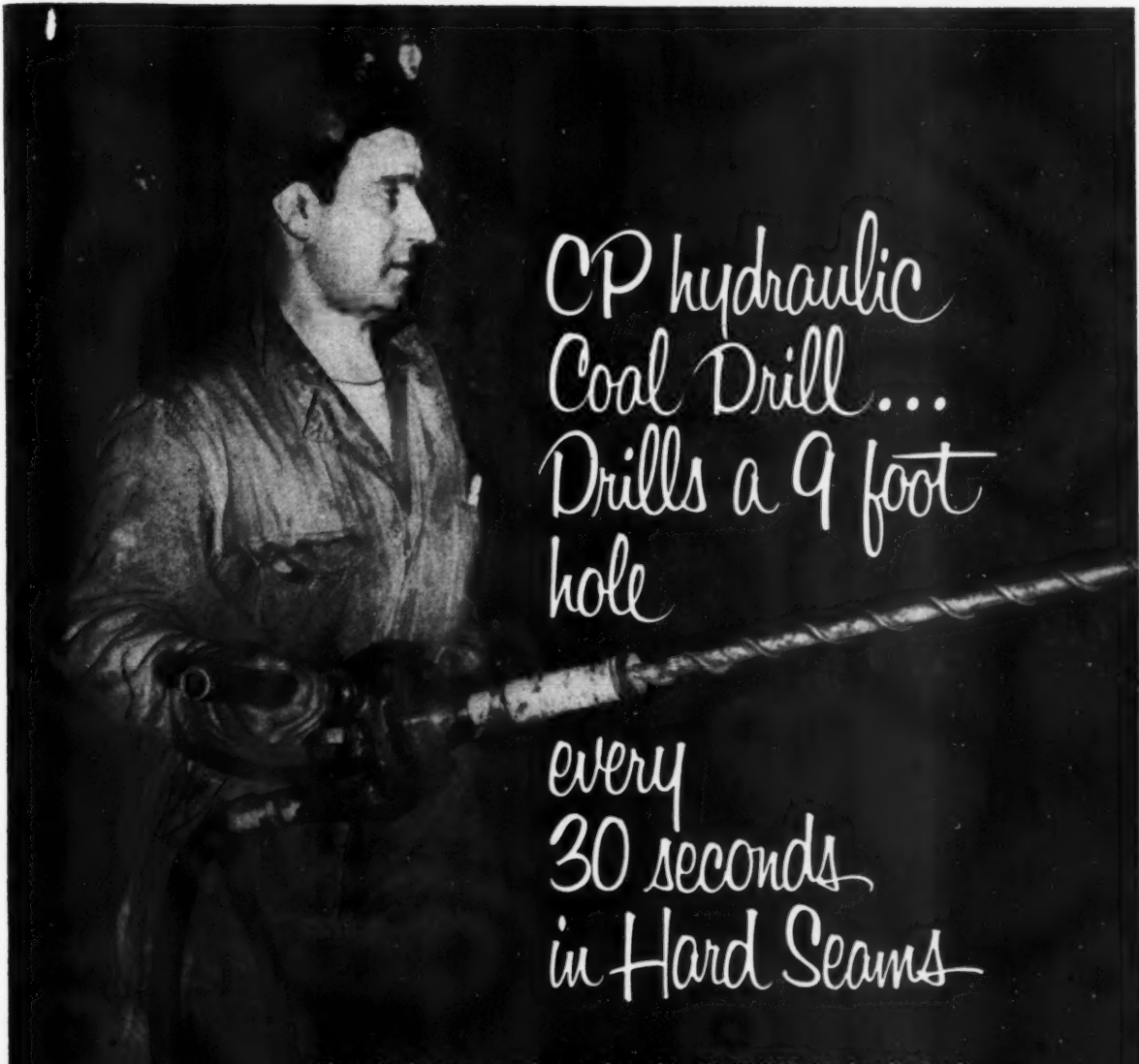
Tests Carefully Controlled

In all instances the holes were carefully measured, the burden on the hole was calculated, and a sufficient amount of powder placed in the hole to break the rock. Because of some doubts expressed approximately one extra case of powder was added to each hole to insure proper breakage. It was found that the powder rise was such as to give room for ample stemming to prop-

(Continued on page 105)



Track shifting and maintenance are a major job at China



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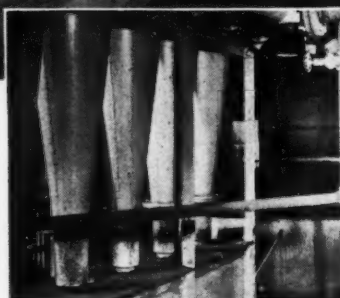
ONE MAN OPERATES Westmoreland Coal Company's

New Fine-Coal Washing Plant . . .

Designed and Built by *Heyl & Patterson*



- A. Raw Coal Feed Sluice
- B. H & P 8 way Impulse Distributor
- C. 8 Deister Tables (located on ground floor)
- D. Clean Coal Preliminary Dewatering Screen
- E. 2 Reineveld 36" Fine-Coal Dryers
- F. Cyclone Feed Pump
- G. Five 14" H & P Cyclones
- H. Vacuum Filter
- J. Clean Coal Belt Conveyor
- K. Control Panel for all Equipment



H & P Cyclones produce a slurry having 40%—50% concentration and containing—28 mesh solids (an ideal filter feed) at the rate of 15 TPH.

Two 36" Reineveld Fine-Coal Dryers produce 70 TPH of fine coal with a surface moisture of 4.5%—5.5%.

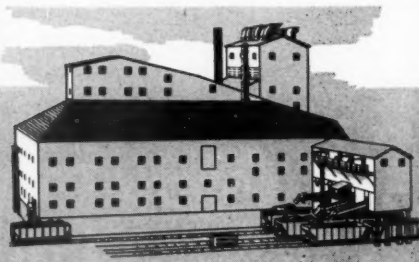


One man operation is possible because all operating units are visible from the operator's station. This modern plant processes 100 tons per hour of $\frac{3}{8}$ " x 0" raw coal feed. It recovers 100% of the clean coal from the tables because the coal circuit is completely closed. It produces a product containing 7½% surface moisture in the $\frac{3}{8}$ " x 0" size.

The raw coal feed is from the Irwin Basin of the Pittsburgh Seam. This Criterion Coal is sold by the General Coal Co., sales agents. Specifications called for clean coal of not more than 5½% ash and .9% sulphur. This H&P designed washing plant is consistently meeting these requirements.

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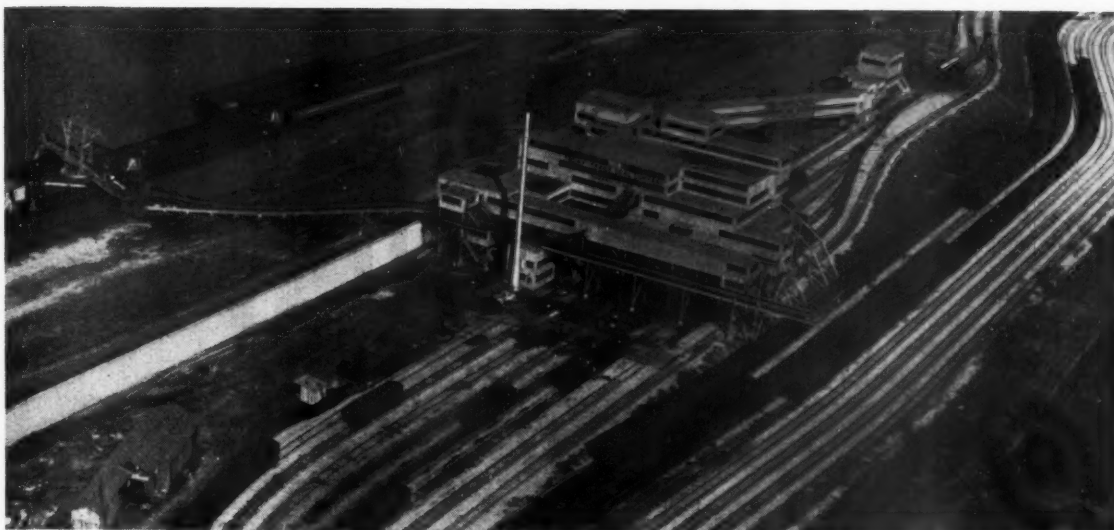


55 FORT PITT BLVD.

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Cleaning Plant Delays



With the large investment in a modern cleaning plant, delays in plant operation should be kept to a minimum

A Study of a Subcommittee of the Coal Preparation Committee Detailing Primary Causes for Delays in Cleaning Plant Operation at Seven Eastern Coal Mines

THE experience of seven large Eastern United States coal operators with delays in cleaning plant operations are summarized in the accompanying table. Because of the manner in which the data was gathered, as well as because of the type of data gathered, it is not advisable to draw a direct comparison in the operation of two different cleaning plants. However, the data is sufficiently correlated to give a very good indication of just what segments of the coal cleaning operation are causing the most headaches as far as work stoppages are concerned.

A careful study of the table shows that not all mining operations are faced with the same problem. Take the item of "no coal" for instance. Several cleaning plants reported no lost time because of "no coal," while others reported up to 12 percent delay because of this one item. On the surface this would suggest that there was a definite need for raw coal bins at the operations which reported a high delay because of "no coal." Service bins might not always be the answer, however. With a lot of refuse present in the coal it means that refuse has to be handled one more time. This in turn increases coal degradation which multiplies the cleaning problem.

Importance of Maintenance Force

The importance of having the right man in charge of the preparation plant cannot be overemphasized. One concrete example will serve to illustrate this point. Approximately two years ago a Pennsylvania coal company placed in direct charge of their preparation plant an engineer with the sole responsibility of getting the plant on its feet. Before this time, the company had a good man in charge, called a preparation superintendent, who was in charge of three foremen, one on each shift. This man was a good worker, tried hard but just couldn't seem to handle the job. Having installed a new plant, the company soon realized that they were not getting expected results and the plant was actually "going down hill." At this time the above-mentioned change was made.

At the time the preparation engineer took over, the company was cleaning 480 tph of washed coal during actual operating time. However, delays were as high as 21 percent of available shift time. Based on available time, the plant was only producing 400 tph of washed coal. The new man has been on the job for two years. For the first eight months of

1955, the greatest delay was 11 percent and the smallest was 4 percent of the available operating time. In addition to this, the plant output of washed coal increased to 560 tph during actual operating time or 520 tph for available operating time. It follows that the cost per ton for coal preparation has been reduced.

This clearly indicates what improved operating procedures and increased efficiency, cooperation of labor and the assistance of supervision of management can do. Good overall management of a property is required but it takes a good man for each specific job. The present preparation engineer at the above plant keeps a good maintenance program, scheduling his work six to eight months in advance. He has full responsibility of the quality of the coal, plant operation, maintenance and labor problems. In addition, he maintains close cooperation with the various mining departments.

Plant Experience

A brief synopsis of the pertinent information in each of the cleaning plants described in table 1 follows:

MINE A

Coal is received in railroad cars from several mines in West Virginia. This coal is usually ROM but on occasions sized coal is received for further processing. Tipple equipment includes: Baum type jigs, centrifugal dryers, thermal dryers, Rheolaveur fine coal washer, and barge loading facilities to river from washing or transshipment of proposed coal.

Seams cleaned are: No. 2 as, Dorothy, Cedar Grove and Five Block. Impurities usually found in the mechanically loaded coal are rock, slate, cap-boards, wire, tramp, iron, etc. Average production per shift is about 6000 tons, which usually included some transhipped coal loaded at a higher rate than coal being processed through the washing and drying circuits. Rejection averages about 10-12 percent of raw tonnage.

The maintenance crew works on the third or off-shift from the loading shifts. Number of men is 13 plus a foreman. Some maintenance is done during first and second shifts (loading shifts). An average of 150 man-hours per 24-hour day is devoted to maintenance or 20-25 percent of total man-hours worked.

General maintenance procedure includes regular inspection of various units; repair and replacement of spare units; progressive replacement or repair of conveyor chain, bottoms, wear

shifts with a total time of 465 hours 45 minutes—is included in the table.

MINE C

The seam mined is the Pittsburgh No. 8 which averages 56 in. high. The impurities removed are both seam impurities and extraneous matter picked up in both stripping and underground operations.

The preparation plant cleans 7-in. by 0 coal. The 7-in. by 1½-in. coal is cleaned in two Mogul jigs; 1½-in. by ¾-in. coal cleaned in a 16-ft 6-in. Chance Cone and a 13-ft 6-in. Chance Cone; and the ¾-in. by 0 is cleaned on 32 Deister tables. The ¾-in. by 0 coal is thermally dried in four Raymond Flash Driers and 1-in. by ¾-in. coal is thermally dried on four especially designed conveyor type driers. The water circuit is closed, clarification being done in a large settling pond.

The maintenance organization consists of 32 men, working a 7¼-hour

original copy of the work order is filed with the master mechanic and a carbon copy is sent to the superintendent.

An accurate cost is kept on IBM machines of the various costs, both labor and supplies, to be charged to any particular job in the plant. Each piece of equipment has a code number and is broken down into several component parts so that the master mechanic knows which piece of equipment and what part thereof is high maintenance. The warehouse at the preparation plant is controlled by IBM accounting machines and an adequate supply of the proper materials is kept on hand. With a maximum and minimum set up by the master mechanic, the warehouse balance is kept to a workable minimum.

Records of special maintenance problems are kept by the master mechanic and discussed at regular meetings of the master mechanics, the superintendent and the plant engineers. Data

TABLE I—CLEANING PLANT DELAYS BY CAUSE EXPRESSED IN PERCENT OF WORKING SHIFT

	Dumping	Crushing	Screening	Picking	Cleaning	Dewatering	Conveying	Power Failure	Refuse Disposal	Coal Loading	No Coal	Other	Delays Due to Equipment Breakdowns	Operating Delays	Total Delays
Mine A				0.61	(Mechanical & Electrical)					0.33	0.24	0.38	0.61	0.95	1.56
Mine B		0.11	0.38			1.26	0.40	0.27	0.22		11.08		2.65	11.08	13.73
Mine C	0.78	0.49	1.06	0.26	1.17	0.2	0.39	0.13	0.2	0.45		0.52	1.47	3.82	5.29
Mine D	0.46	0.14	0.09		0.12		0.63			0.33	10.54	0.92	1.05	12.18	13.23
Mine E		0.79	0.18	0.06	0.47	0.71	0.42	0.33	0.23	0.06	0.39	0.59	1.87	2.36	4.23
Mine F			5.57			2.08	3.35	3.14	0.76	2.84		2.90	11.00	9.64	20.64
Mine G	1.27	0.11	0.33		0.49		0.83	0.16			11.97	0.58	3.29	11.45	15.74

plates, etc. Electricians maintain and repair all motors and electrical installations.

Delay times are clocked (not estimated) and the information in the table gives a summary based on one month operation of two shifts per day, having a total available cleaning plant time of 276 hours.

MINE B

The seam mined is the Elkhorn No. 3, with a height of 43 in. The coal is medium firm, with no seam impurities.

Average production is 3900 tpd in three shifts. ROM is crushed to 8 in. by 0 and without prescreening and is washed in a Baum jig. Fine sizes are centrifuged, then thermally dried. Water is clarified by a centrifuge and in settling ponds. The reject is 10 percent.

A plant foreman with one assistant directs the labor force of 18 men (6 men per 7¼-hour operating shift). Operating personnel are also trained maintenance men and carry out all maintenance work in the plant during on-shift idle time or on week-ends, as is necessary. A summary of one month operation—21 days @ three

shift, headed by a master mechanic with maintenance foremen and a chief electrician under him.

There are 11 men on the operating maintenance crew. These men do regular maintenance work on each operating shift. Seventeen men perform the scheduled jobs, those which the operating crews cannot efficiently handle. In the maintenance organization, there are two men who are called build-up and shop fabricating men. There are also two men who inspect the plant constantly, looking for defects in equipment and making their reports to the master mechanic.

The two inspectors go through the plant, inspecting the machinery and make a work order for repairs. Work orders are then turned over to the master mechanic and he determines the priority of the job and the type of material to be used. He in turn allocates the work to the maintenance foreman who assigns men most skilled in that particular phase in making the repairs. After the job is completed, the mechanics post on the work order the hours required for the job, also any special test material used as well as the condition of surrounding material if it is not up to standards. The

shown in the table cover an operating period of 49 shifts. Shift production runs about 10,000 tons with a 20.2 percent reject.

Training Program

Operating foremen are used in regularly scheduled maintenance work with the maintenance foremen. This makes all plant operating and maintenance personnel conscious of maintenance problems and also allows for closer supervision of maintenance jobs. There is a regular maintenance training program for mechanics in which they are taught: (1) new materials and methods; (2) the operation, purpose and limits of the equipment; (3) mathematics, hydraulics, etc.; (4) the cost of supplies and labor which they use.

There are 2¼ hours at the end of the day shift each day in which the plant is idle since it is run 21¼ hours in succession. This allows some time for maintenance without shutting down the plant.

MINE D

The seam mined is the Cedar Grove (Lower), with a height of 56 in. Im-



One company stresses importance of good maintenance by having the production foreman supervise repairs

purities consist of slate and bone. The average dumping rate is 425 tph of material which has 21.2 percent reject. The plant operates two 7¼-hour shifts per day. A repairman, a repairman's helper and a lubricator are used in the maintenance crew on each of the first two shifts. Three repairmen are used on the third shift.

Information in the table is based on 62 shifts of operation.

MINE E

The operation is a drift mine located in southern West Virginia with a daily production of 3500 tons of clean coal. The mine is in the Hernshaw seam which averages 45 in. in height, and with mechanical loading the rejects are about 15 percent. To date, the impurities consist largely of draw rock which is mined with the coal.

The ROM coal from the 250-ton storage bin is crushed in a large double roll crusher to 5 or 6 in., washed to zero in Baum jigs and mechanically dewatered on a battery of vibrating screens. The fine coal is centrifuged and thermally dried before being loaded into railroad cars. A continuous type aerial tram is used to transfer washer rejects to a bin on top of the mountain. Final disposal is by aerial tram bucket to the refuse storage area in the adjacent ravine.

The plant is operated two shifts per day, 7¼ hours each, by a total personnel of 44 men, of which 13 are for maintenance. Seven of these maintenance men are used on the third shift for the inspection and repair of equipment. Three men are used on the first and second shifts, each for maintenance and emergencies.

Delays which are summarized in the table occurred over 82 operating shifts. They were clocked and not estimated.

MINE F

The seam mined is the Pittsburgh which has an average height of 6½ ft, with the characteristic seam partings. The mine produces 7000 tons of clean coal per day.

The cleaning plant operates 1½ shifts per day—a standard shift being 7¼ hours. The day shift has a crew of five men to operate the plant with an additional electrical force of two men. On the second shift five men operate the plant for the one-half shift the plant is running and work on equipment maintenance during the remaining one-half shift.

The cleaning plant feed, 8-in. by 0 ROM, goes through a Baum jig for the primary separation; the ¾ in. by 0 is further treated on tables. De-

watering and drying consists of the following: ¼-in. by ¾-in. by mechanical drying, ¾-in. by 10-in. mesh with dewatering screens; 10 mesh by 0 through filters and ¾-in. by 0 through flash dryers. In addition, the plant operates water clarifiers, thickeners, and rotary disk filters.

Information in the table is based on a summary of plant delays occurring in a 15-day period operation 1½ shifts per day.

MINE G

The plant processes 2000 tph of Pittsburgh coal, full seam mined, with a reject of 30 percent. Operation is on two shifts with the maintenance work being largely on the third shift.

Operating shifts have some maintenance men for regular lubrication and inspection of units who are also available for emergency repair work. These men report through a log book to the master mechanic who schedules the repair work during the off shift.

Major unit overhaul is planned on a monthly basis and progress reported in a monthly summary. A record is kept of the major rehabilitation with a card index system. Mechanical hours are recorded, both in regard to planned maintenance and in routine repair, against the groups of units.

An engineer supervises the entire maintenance program. He is responsible for the placing of the men and for their educational program. He is also responsible for investigating the failure of material to give good life and for suggesting a remedy if possible.

Planning for effective preventative maintenance requires good methods, material and records. All are necessary for low labor and material cost.

Data presented in the table is based on 206 operating shifts.



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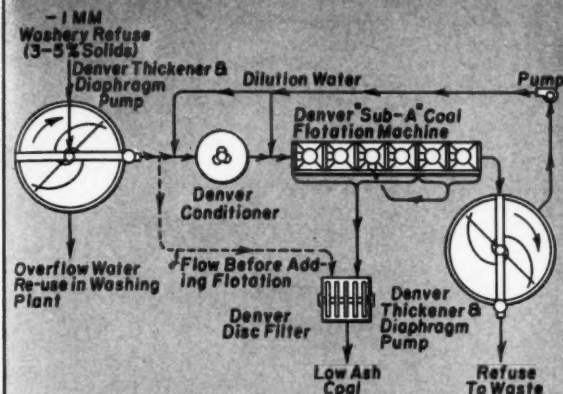
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[Page 82]

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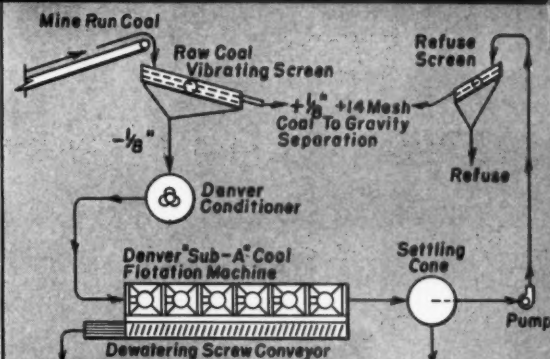


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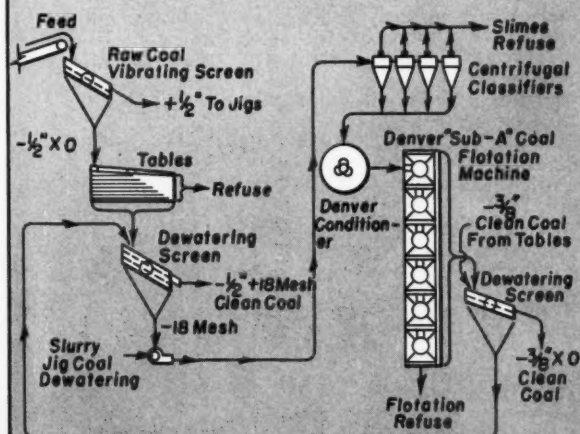


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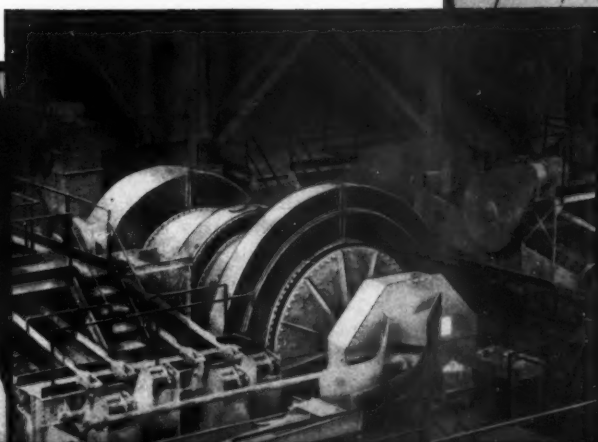
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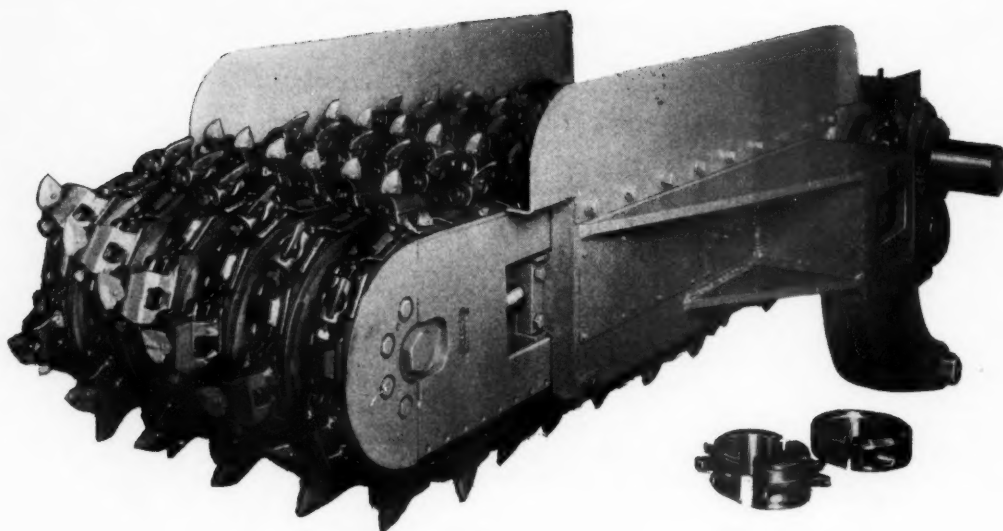
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1956 Coal Convention

Promises to Be Another Outstanding Meeting

COAL production has bounced back from last year's low and the entire industry is looking forward to a brighter future. With this optimistic note as a background, plans for the 1956 Coal Convention of the American Mining Congress at the Netherland Plaza Hotel in Cincinnati, May 7-9, are beginning to roll.

The yearly coal conventions of the Mining Congress are widely recognized as the forum where the newest in coal mining and coal preparation technology and equipment is discussed. Actually these conventions have charted technical progress within the industry over the past several decades, and next year's convention will continue this great tradition.

The Program Committee, under the chairmanship of G. A. Shoemaker, executive vice-president, Pittsburgh Consolidation Coal Co., will hold its first meeting shortly to select subjects to be discussed at the meeting and speakers to present them. The

Committee is made up of a wide cross-section of the coal industry—including operators from the major coal fields, representing both strip and deep mines, together with a representative group of manufacturers of mining equipment.

An intensive campaign for suggested topics to be presented at the meeting has been conducted. To assist the Program Committee in its work, the industry has been asked to submit suggestions for topics to be included in the Convention Program. Hundreds of suggestions have been received, and these will serve as a guide to the men who will organize the sessions for the 1956 Coal Convention.

During the Convention there will be morning and afternoon sessions on each of the three days. Luncheon meetings will be held on Monday and Tuesday, May 7 and 8, featuring guest speakers who will deal with subjects of major interest. A "baseball night" is scheduled for Tuesday. Another high-



G. A. Shoemaker

light of the Convention will be the annual banquet on Wednesday night.

A tentative outline of the Program put together by the Committee at its November meeting will be published in the December issue of the MINING CONGRESS JOURNAL—watch for it.

Now is the time to make your plans to attend this important industry gathering. A record attendance is expected and hotel reservations should be made as early as possible. Write, wire or call the hotel desired at your earliest convenience.

Program Committee

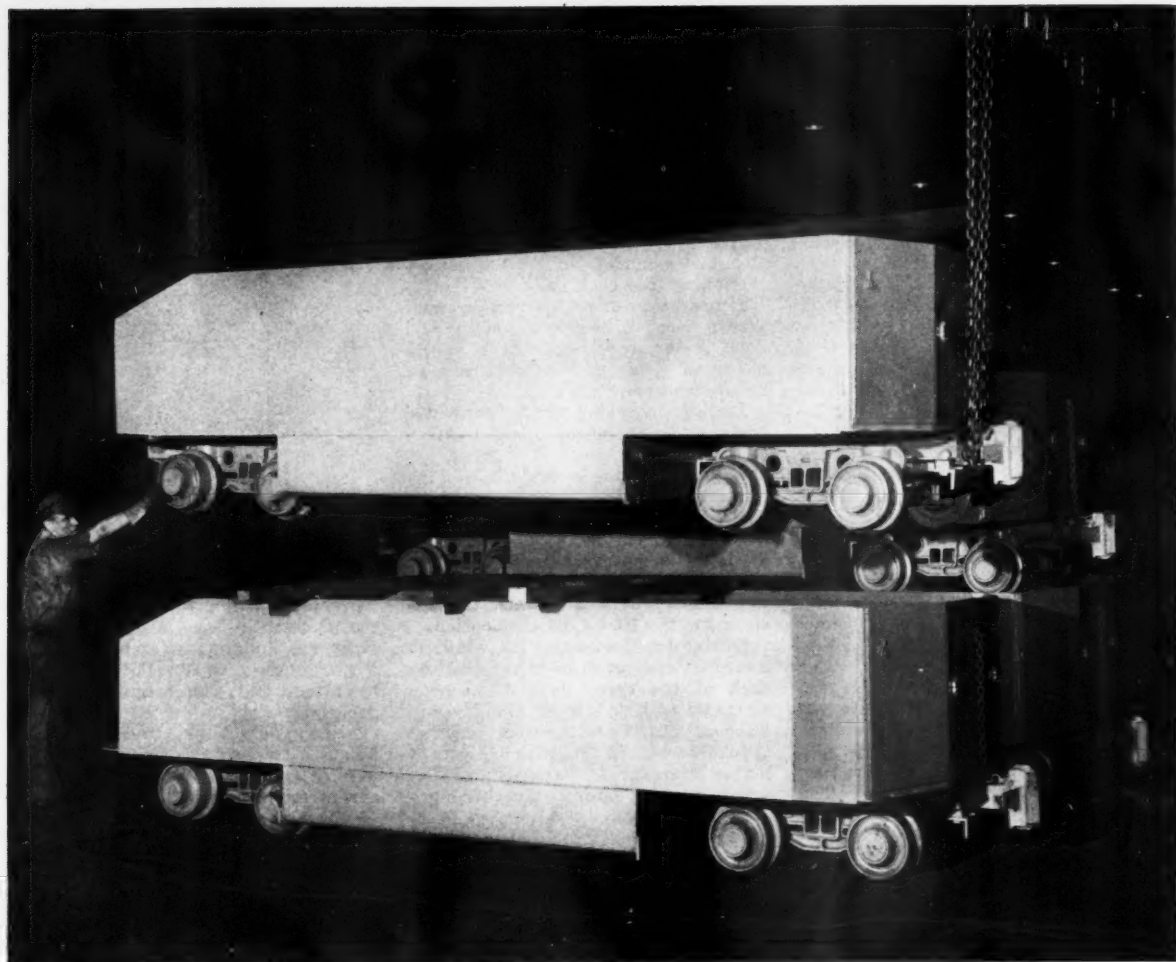
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Wheels of GOVERNMENT



As Viewed by HARRY L. MOFFETT of the American Mining Congress

MAJOR activity in the Nation's Capitol these days centers about efforts of the political parties to draw the battle lines for the forthcoming national election. The feverish activity at headquarters of both parties indicates that the next session of Congress will be guided by political considerations to a larger extent than in the past two years. The lawmakers will weigh their actions on legislative proposals on the basis of their effect upon the ballot boxes.

The President, making a steady recuperation from his heart attack, has taken over the helm of the Government and is already busy preparing his State-of-the-Union message for the next session. The legislative program which he will advance is not likely to have smooth sailing due to the political overtones of the time. Attacks upon his proposals for a domestic farm program, for tax policy, for expanded highway construction, and for defense spending are likely to be leveled early in the session.

Meanwhile, on the foreign scene there is increased optimism that "peace within our time" may become a reality, largely due to the aggressive leadership of the President and the somewhat tempered actions of the Soviet. High officials, however, have adopted a "wait and see" attitude towards recent Russian moves and are keeping our defenses up.

Freight Rates Increased

On October 18, the Interstate Commerce Commission authorized the nation's railroads to continue in effect the 15 percent freight rate increases which it had granted in 1951 and 1952. These increases were due to expire December 31, 1955.

In announcing the increases, the ICC also ordered the railroads to no longer show the increased rates as surcharges to the amount of the freight bill, but to publish them to apply in connection with rates per 100 pounds, per ton, per car, or per other unit of transportation.

The Commission turned down peti-

tions of coal industry organizations which had charged that the increases in rates for the transportation of coal have resulted in freight rates and charges which are excessive and unlawful, and had urged their cancellation.

Coal industry spokesmen immediately pointed out that the permanent freight rate hikes granted by the ICC will cost coal consumers \$100 million a year. They also declared that the decision ignored a recommendation of the Cabinet Committee on Energy Supplies and Resources Policy, which called for the ICC to adjust freight rates to the extent necessary to remove the "excessive and disproportionate contribution that coal rates are making to meet the cost of other unprofitable services of the railroad industry."

Senator Matthew M. Neely (Dem., W. Va.) also leveled a sharp attack on the ICC decision, charging that its action was "a job of railroading in defiance of justice and contrary to standards of free competition." He promised to introduce legislation early in 1956 to make redress to the coal industry.

Wage-Hour Broadening

Secretary of Labor James P. Mitchell has disclosed that he will urge Congress to broaden coverage under the Wage-Hour law. He told a recent news conference that Labor Department recommendations on making more workers eligible for minimum wage coverage are pretty nearly completed and should be ready for presentation to Congress in January.

The Labor Secretary refused to elaborate as to what broadening of the law is under consideration, but stated that the whole problem of coverage has changed since Congress hiked the wage floor to \$1 an hour instead of the 90-cent minimum the Administration had sought.

New Highway Program

The Administration intends to press for approval of a broad highway construction program at the next

★ ★ ★ ★ ★ ★ ★

Washington Highlights

FREIGHT RATES: Hiked permanently.

WAGE HOUR: Broadened coverage proposed.

HIGHWAYS: Compromise program sought.

TAXES: Personal rate reductions in offing.

COAL MINIMUM WAGE: Set for public contracts.

STOCKPILING: ODM gets release authority.

★ ★ ★ ★ ★ ★ ★

session, and has indicated that it will make whatever reasonable concessions on financing may be required to get it approved. At the last session the President's proposal for a vast highway program financed through a bond issue was stymied when majority members of Congress sought to substitute a plan of financing through taxes on gasoline, tires, and diesel oil and other imposts on highway users.

Secretary of Commerce Sinclair Weeks recently told the Commerce Department's Business Advisory Council that the Administration wants the highway program enacted and is willing to accept a new plan for financing it. He said the Government might be willing to agree to the tax program or to a combination of taxes and bond financing, but the main thing is "to get a highway program." He stated that he had conferred with representatives of truck and bus operators and other highway users and has found that everyone wants a highway bill.

During the last session, when the proposed tax-financing program was up for consideration, the American Mining Congress advocated amendment to exclude off-the-highway vehicles used in mining from the proposed tax increases on gasoline, diesel

oil and tires, and this amendment was included in the measure as placed before the House.

Tax Outlook

Treasury Secretary George Humphrey has indicated he is hopeful that the Federal budget will be balanced during the current fiscal year. He has emphasized that tax reductions next year depend on the success achieved in balancing the budget. Others close to the Administration have been predicting that no matter what the budgetary situation is next year, the Government will probably seek some tax rate reductions on individual incomes, particularly in the lower income brackets.

The two top majority members of the Senate Finance Committee, Chairman Harry Byrd (Dem., Va.) and Senator Walter George (Dem., Ga.), differ on the possibility of tax reductions next year. Byrd, reiterating the position he has held for some time, has stated that while the budget for this fiscal year may be brought into balance by June 30, 1956 this does not mean there will be a surplus sufficient for tax reductions. George, on the other hand, favors tax relief for lower and middle income groups regardless of the budget situation.

Meanwhile, a House Ways and Means subcommittee has concluded hearings on proposals to amend the excise tax law and will meet again this month to draft recommendations to submit to the full Committee. The Administration witnesses who appeared before the subcommittee opposed any changes that would cost the Government any appreciable revenue. Some observers in Washington are predicting that excise relief will take the form of technical changes in the law rather than in rate cuts.

Walsh-Healey Coal Determinations

On October 21, Labor Secretary Mitchell issued the first minimum wage determination for the bituminous coal industry ever approved under the Walsh-Healey Public Contracts Act, which applies to Government supply contracts in excess of \$10,000. The minimum rates had been sought by a large number of coal producers and by the United Mine Workers of America.

Under the Secretary's order minimum wage rates ranging from \$1.40 an hour for Iowa to \$2.346 an hour for Montana will apply to bids made by bituminous coal producers on Government supply contracts on or after November 25. Most significant of the rates is \$2.245 an hour, which will apply in the eighth districts that account for about four-fifths of total United States coal production. These districts include Pennsylvania, Mary-

land, West Virginia, Virginia, Eastern Kentucky, Northern Tennessee, Ohio and Illinois. Government purchases of coal last year totaled about 13 million tons, with TVA accounting for about three-fourths of this tonnage.

The rates set by the Labor Department order are the minimum wages to be paid day workers engaged in Government contract work. In the case of tonnage workers, the minimum wage requirements will be considered met if a majority of the tonnage workers in the mine with a Government contract earn the minimum applicable in their district, and the average earnings of the tonnage workers as a group are in excess of the minimum.

The order does not apply to engineering crews, weighmen, supply clerks and other auxiliary workers traditionally regarded as management employees in the industry, to whom collective bargaining agreements do not apply.

It is expected that the Labor Secretary's findings will be challenged in court by some coal producers who have fought proposals for establishing "prevailing" minimum wage rates under the Government Contracts Act.

In another move, Secretary Mitchell announced a proposed amendment to regulations under the Public Contracts Act which would enable business firms to sell coal to the Government if they are engaged in buying and selling coal in cargo or carload lots on their own account, or if they are authorized by one or more mines to sell for them in such lots.

Stockpiling Report

The latest report of the Office of Defense Mobilization on the progress

of the stockpiling program shows that over a million tons of critical materials valued at \$300 million were placed in the stockpile during the first half of 1955.

Materials valued at \$4.9 billion are now on hand in the stockpile, ODM said. This is a little more than half of the \$9.6 billion overall objective.

The President has just delegated to ODM the authority to release or dispose of materials in the national stockpile when required to meet needs of the common defense or in time of war or national emergency. ODM Director Arthur Flemming in his address at the AMC convention in Las Vegas made this important observation as to release of materials from the stockpile: "Once materials are placed in the stockpile they should be insulated unless they are required for the common defense. No one in the Executive Branch should ever be given the authority to release such materials when, in his judgment, it would be in the best interests of the civilian economy to do so. If such authority were ever granted, it would mean that billions of dollars of materials would constantly be over-hanging the market."

Meanwhile, the stockpiling program of ODM has come under attack from a company holding a defense contract with the Air Force. Hoyer Products Co. of New Jersey has filed a suit in Federal District Court asking the Court to declare illegal ODM's copper stockpiling program since January, to enjoin the diversion to industry of 11,000 tons of copper scheduled for delivery to the stockpile through December, and to order the release of copper from the stockpile to permit Hoyer to complete a contract with the Air Force.



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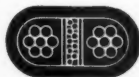
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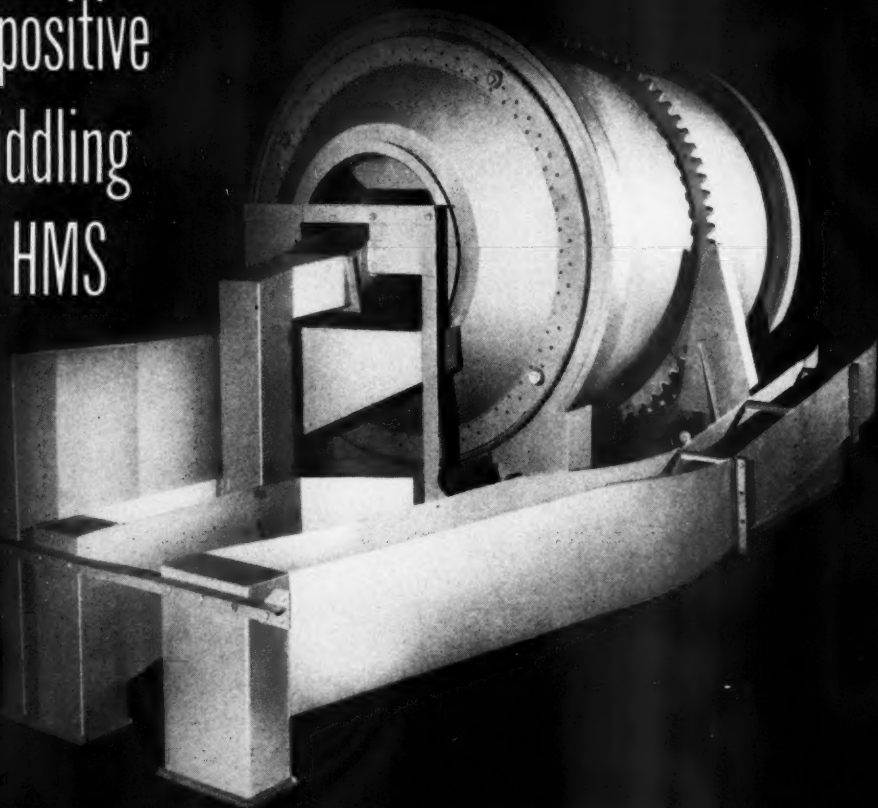
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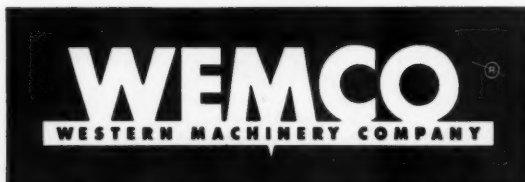
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Personals

J. B. Haffner, former president of Bunker Hill & Sullivan Mining & Concentrating Co., has been named president of International Oil & Metals Corp.

International Oil and Metals has embarked on a mining and petroleum exploration program of natural resources from Canada to Mexico, including uranium, copper, tungsten, quicksilver, rare earth, iron, lead, silver, zinc and oil. It has working control of International Metals Corp. of Idaho, Silver Ridge Mining, Ltd. of Canada, Montana-Arizona Copper Mines, at Ajo, Ariz., and International Iron Mines Ltd. of Canada.



Dr. Roger Bart has been appointed manager of International Minerals and Chemical Corporation's Research Experiment Station at Mulberry, Fla.

Clyde V. Bailey, an agent for Pochontas Land Corp., has retired after 52 years of active service to this subsidiary of the Norfolk & Western Railway. **Paige Wooldridge**, a former assistant land agent, was appointed successor to Bailey.

Edward Wisser and **Manning W. Cox**, mining geologists, recently announced their association as the firm of Wisser and Cox, consulting geologists. They are planning to establish consulting practice to carry on exploration campaigns for all minerals and to do examination work in any country. They are also equipped to do mine valuations for either owners or investors and will carry on resource investigation and appraisal, geologic studies of mines and mining districts and offer their services in connection with operating problems and property acquisition. They can be reached at 55 New Montgomery St., San Francisco, Calif.

Jacob Blecheisen, president, Rosiclare Lead and Fluorspar Mining Co., was recently appointed by Interior Secretary Douglas McKay to serve on

the Fluorspar Industry Advisory Committee, Office of Minerals Mobilization. This committee, like other industry advisory committees, will render advice and counsel to the Government and make recommendations as to the solution of many production problems connected with mobilization planning. Its members are all prominent business men serving the Government without compensation of any kind.

A. P. Morris, general manager of Kennecott Copper Corporation's Ray Mines Division, has announced the following changes in his staff. **Ray W. Ballmer**, mine industrial engineer, has been appointed assistant pit superintendent at Ray, succeeding **B. C. Lansing**, who has been transferred to the post of general manager of the Tin & Associated Minerals, Ltd., in Africa—a firm in which Kennecott holds a 52 percent interest. **C. Waldie Taylor** has been appointed general pit foreman at Ray. He formerly was drilling and blasting foreman there.

J. E. Foard has been appointed metallurgist at the Douglas Smelter of Phelps Dodge Corp. Foard has been with the Douglas Smelter organization in various capacities for seven years, after having been with the Inspiration Copper Co. for one year. He is a graduate of Washington and Lee University with post graduate work at the University of Arizona.



John W. Leber has been appointed division industrial engineer-Raw-Materials in Jones & Laughlin Steel Corp.'s general office, Pittsburgh. He formerly was mine industrial engineer at J & L's Michigan ore division, Negaunee, Mich.

Leber replaces **Charles E. Woll**, who has been named assistant works industrial engineer at J & L's Pittsburgh works division.

Carl F. Clausen has been appointed director of the newly created Manufacturing Process Department of the Portland Cement Association, Chicago.

Before joining the Portland Cement Association in 1947, as manager of Manufacturing Research, Clausen was assistant to the president for Engineering and Manufacturing of the Pacific Portland Cement Co. in San Francisco.

Albert L. Copp has been appointed assistant manager in charge of aluminum ore exploration in the exploration department of Kaiser Aluminum & Chemical Corp. He will be located at the corporation's headquarters in Oakland, Calif.

H. B. Jones has been appointed general manager of the Stone, Ky., mine of the Eastern Coal Corp.

Maurice F. Dufour has been elected vice-president of Nicaro Nickel Co., wholly-owned subsidiary of Freeport Sulphur Co.

Dufour, who has been associated with Freeport or subsidiary companies in technical and executive capacities since 1933, will be in charge of the company's project to develop nickel and cobalt ore bodies at Moa Bay on the northeastern coast of Cuba.



Robert P. Bremner of Canfield, Ohio has been appointed manager of mining operations for the Youngstown Sheet & Tube Co. Since 1951 Bremner has served as assistant to the vice-president in charge of operations.

Two promotions have been announced by **A. J. O'Connor** of Consolidated Coppermines Corp., Kimberly, Nev. **W. J. Latvala**, former assistant chief engineer, has been promoted to mine superintendent, and **Charles R. Sacrison** has been advanced to general pit foreman in Coppermines' new Tripp Copper Pit at Kimberly.

At the same time it was announced that **John Eaby**, chief clerk of Consolidated Coppermines Corp., retired October 1. Eaby joined the staff of Coppermines' predecessor company, the Giroux Consolidated Copper Co. in 1911 as an accountant. He will be retained by Coppermines in a consulting capacity.

E. C. Wharton has been appointed to succeed Eaby. Wharton served with the Fresnillo Co., Fresnillo, Mexico, and the Chile Exploration Co. at Chuquicamata, Chile, as chief accountant.

Charles C. Towle, formerly Chief of the Denver Exploration Branch, Division of Raw Materials, of the Atomic Energy Commission, has joined The American Metal Co., Ltd., in Denver in charge of their Western Exploration activities.

Stewart L. Deck was recently appointed general manager of the Jacob's Fork Pocahontas Coal Co., Bishop, W. Va.

Kenneth L. Isaacs, vice-chairman of the Trustees of Massachusetts Investors Trust, was elected a director of The New Jersey Zinc Co. at a special meeting of stockholders of the company on October 20. Isaacs is also a director of the Southern Pacific Co., Phelps Dodge Corp. and other corporations.

Chester R. Beam, formerly an inorganic chemist with the United States Bureau of Mines at Albany, Ore., has joined American Potash & Chemical Corp. as a research engineer at the company's main plant at Trona, Calif.

Robert C. Hills has been elected executive vice-president and a director of Freeport Sulphur Co. by the board of directors.

Hills joined Freeport in 1934 as an assistant chemist in the company's Grande Ecaille laboratory in Louisiana. He has played an active part in the expansion activities of the company, particularly those related to sulphur and nickel. Hills was named assistant to the president in 1947 and elected a vice-president in 1950.

Herbert D. Fine recently resigned as manager for Bald Mountain Mining Co. to accept a position with the Fresnillo Co., Fresnillo, Zacatecas, Mexico.

William P. Drake, former executive vice-president, has succeeded George P. Beitzel as president of the Pennsylvania Salt Manufacturing Co.

Pickands Mather & Co. recently announced the following changes in personnel on the Gogebic iron range operations of the firm in northern Michigan and Wisconsin.

R. L. Jose has been transferred from superintendent of the Anvil mine to superintendent of the Mauthe mine. The Mauthe mine, formerly Oliver Iron Mining Division's Geneva mine, was taken over recently by Mauthe Mining Co. and is now being operated by Pickands Mather & Co.

Albino J. Ciquallio, mine captain at the Sunday Lake mine, has been transferred to the Anvil mine as assistant superintendent. B. E. Cary, assistant mining captain at the Cary iron mine, has been transferred to Sunday Lake as mining captain.

R. Tregembo, mining engineer at Cary, has been promoted to assistant mining captain at Cary.

Lawrence G. Woodworth, mining captain at the former Newport mine, is now assistant superintendent of the Mauthe mine.

Kenneth MacDonald, operating engineer at the Newport, has been ap-

pointed mining captain at Mauthe. Eugene Carlson has been appointed operating assistant at Mauthe.

Leonard Beissel, assistant mining captain at Anvil, has been transferred to Mauthe mine as mining captain.

L. E. Anderson, operating engineer, has been appointed to assistant mining captain at the Peterson mine.

M. Perpich, shift foreman at the Anvil mine, has been promoted to assistant mining captain at Mauthe mine.

O. Vispi has been transferred from Anvil engineering force to the Cary mine as mine engineer.

— Obituaries —

J. Hammond Brown, president of the Outdoor Writers Association of America, Inc., died suddenly on August 13 in Baltimore, Md. For over 50 years he was associated with the *Baltimore News-Post* and his name is particularly well known to those mining men who are interested in conservation work.

Robert Perry Tyler, vice-president in charge of sales of Macwhyte Co., died October 2, in Kenosha, Wis.

Mr. Tyler joined Macwhyte Co. in 1945 as general sales manager, was elected a director in 1946, and appointed vice-president in charge of sales in 1947.

Prior to his association with Macwhyte Co., he was employed by John A. Roebing's Sons Corp., and A. Leschen & Sons Rope Co. as general sales manager.

Guy Dingess French, 72, died in Bluefield, W. Va., July 17. Mr. French and his brother Charles W., formed the French Coal Co. in 1926. The partnership remained intact until his death. He was also secretary-treasurer of the Home Creek Smokeless Coal Co. in Virginia and the Peter White Coal Co. in West Virginia, both subsidiaries of the French Coal Co.

Emmett Butler, 85, chairman of the board of directors of the Pioneer Mining Co. and for 50 years one of the leading pioneers of iron ore mining and concentrating techniques, died on August 24. Mr. Butler was prominent with his brothers as a partner and president of Butler Bros., a firm which operated mines on the Minnesota iron ranges. His firm introduced many new techniques in the concentrating of ores by washing and by heavy media separation, and in operations by using the first full revolving steam shovel, pioneering the introduction of trucks in iron mines, installing early conveyor-belt hoisting, and using a large sized dragline for stripping. In later years Mr. Butler operated the Mary Ellen Mine at Biwabik, Minn., and organized the Kansas-Nebraska

Pipeline Company whose goal is to deliver natural gas to northern Minnesota.

Lincoln Kilbourne, 44, general manager of sales, Industrial Division, of The Jeffrey Manufacturing Co., Columbus, Ohio, died October 5 following a heart attack suffered at work two days earlier.

Mr. Kilbourne had almost 22 years of service with Jeffrey in a sales capacity. He was graduated in 1933 from the Ohio State University with a Bachelor of Science Degree in Ceramic Engineering.

Coleman L. Griggs, 50, assistant general superintendent of Wisconsin Steel Co. coal mines of the International Harvester Co. at Benham, Ky., died July 24. Mr. Griggs began working with the company 32 years ago as an accountant. He was one of the original promoters of Harlan County's annual Black Diamond Festival.

George C. Niday, pioneer Tri-State mining man, died in a Kansas City hospital, September 30.

Mr. Niday was one of the principal developers of the Picher lead and zinc field. In 1915 he went to work for the Picher Lead Co., predecessor of the Eagle-Picher Lead Co., to sink this firm's first shafts in the Picher district. He was promoted to general ground foreman for Eagle-Picher Lead Co. in 1916 and 10 years later was named general manager of the company's mines. He became general manager of the Tri-State mines division of the Eagle-Picher Mining & Smelting Co. in 1937. He continued in that capacity when Eagle-Picher purchased the Commerce Mining & Royalty Co. in 1939 and retired in 1944.



NEWS

and VIEWS



Eastern and Central States



Off Shore Sulphur

A vice-president of Humble Oil & Refinery Co. has reported that his company discovered sulphur deposits off the Louisiana Coast that may hold "30 or 40 million tons." The discovery was reportedly made in 40 ft of water, about six miles off the coast.

Humble discovered this sulphur bed while looking for oil. Oil was also found in the area.

C&O Expands Dock

The Chesapeake and Ohio Railway has announced a \$2,500,000 expansion project at its coal dumping facilities in Newport News, Va. The new facility is scheduled for completion in about 12 months. It will consist of a dumping tower and related pier, conveyor, track and yard facilities. Six ships can then be loaded simultaneously instead of the present five.

Increase Titanium Reserves

Titanium ore reserves of National Lead Co. have been strongly supplemented recently by the discovery of a new deposit at its properties at Tahawus, Essex County, N. Y., and in Norway, and by the purchasing of large tracts of titanium-bearing lands in North Central Florida. The above announcement was made by Joseph A. Martino, company president, in New York on October 3.

The new discovery in New York is

within 1½ miles of the existing plant at Tahawus where 5000 tpd of titanium ores are currently being treated and from which 300,000 tons per year of concentrates are produced.

The new discoveries in Norway are within four miles of the company's present titanium mining operations near Sokndal and three miles from the shipping port in Jossingfjord in Southern Norway. Martino said, "the potential tonnage of the Norwegian discovery is very large and it may well develop among the largest reserves of the titanium ore in the world."

Early this year National Lead acquired 6800 acres of land in North Central Florida. These lands adjoin those presently being mined at Trail Ridge and are an extension of that physiographic feature. While these reserves are not as extensive as those in New York or Norway, they can be expected to produce sizeable amounts of ilmenite concentrates.

Phelps Dodge Moves

Phelps Dodge Corp. has announced the removal of its New York offices to 300 Park Avenue, New York 22, N. Y. The announcement applies also to its refining and wire mill products subsidiaries, the Phelps Dodge Refining Corp. and the Phelps Dodge Copper Products Corp.

The offices of the Phelps Dodge organization had been located in the downtown district continuously since 1834 when the company was a partnership. For the last 25 years the corporation was located at 40 Wall Street.

New U.S.B.M. Division

The U. S. Bureau of Mines has established a new division to be known as the Anthracite Coal Division.

Secretary of Interior Douglas McKay said the new division will direct the Federal Government's part in the \$17,000,000 Federal-State mine drainage program in the Pennsylvania anthracite region. The division also will guide research aimed at increasing anthracite mine productivity and expanding uses for hard coal.

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West Virginia Strip Mining

Strip and auger mining are on the increase in West Virginia. Julius Olzer, state mines chief, reported in mid-September that 126 strip and auger permits were issued by his department between January and June this year, compared to 96 for the same period last year.

Between January and June this year strip mines spreading across the face of West Virginia produced 3,774,048 tons of coal under authority of 118 permits. During the same period last year, strippers turned out 3,108,393 tons by authority of 108 permits.

In the auger mining segment of the industry, 31 permits were issued in the State for the January-June period of this year for an output of 850,088 tons, as against 29 permits and 571,726 tons in the same period of 1954.

Making Taconite Pellets

Initial operations of Reserve Mining Company's huge E. W. Davis Works at Silver Bay, Minn., began the week of October 9.

In making the announcement, W. M. Kelley, company president, pointed out, "While it will be three or four months before construction of all 12 sections of the plant is completed, the

first section is ready to go. What we learn in starting it up will help us when we begin to turn over each succeeding section."

When completed, the plant will have an annual capacity of 3,375,000 long tons of iron ore pellets. The output will be shipped to blast furnaces at steel plants of Republic Steel Corp. and Armco Steel Corp., joint owners of the \$190,000,000 taconite project.

"Major construction work still ahead," Kelley said, "is in the concentrating building where grinding, magnetic separation, and filtering take place; the pelletizing plant where the taconite concentrate is rolled into balls

and then burned hard to make the finished pellets; and the 150 ft high and 700 ft long ore bridge and other loading facilities for the iron ore carriers which will transport the pellets down the lakes."

Squeeze Non-Union Miners

The Commonwealth of Pennsylvania has moved to put non-union coal operators out of business so far as fuel sales to the State are concerned.

A ruling by that state's Department of Justice now requires bidders for State coal contracts to accompany their bids with: 1—Certified copies of their labor contracts as to wages and working conditions. 2—A statement that the price at which the coal is offered is based, in part, upon payment of the 40-cent royalty to the Miners' Welfare Fund.

The Department of Property and Supplies, which takes the bids and awards the contracts, purchases more than a million tons of coal a year for use in prisons, hospitals, state office buildings and other facilities. Somewhat more than half of this is anthracite.

Kentucky Safety Day

After final tabulations in the 25th Annual Kentucky River Mining Institute's Safety Day Program on Saturday, September 17, three teams of the Blue Diamond Coal Co. claimed top honors. Institute champion was Blue Diamond's No. 2 Mine at Tilford, which won \$150 first prize and trophy. Second place went to the company's mine at Blue Diamond, Ky. Its No. 1 Mine at Leatherwood was third. Second and third prizes were \$120 and \$90 respectively, plus trophies.

Presenting the award was A. D. Sisk, Lexington, chief of the State Department of Mines and Minerals. Representatives of the State Department and of the United States Bureau of Mines judged the event.

Consolation awards were made to teams from Old King Mining Co. No. 2, Hardburly, Ky.; Jewell Ridge Coal Corp., Tilford, Ky., and United Mine Workers Local 9606.

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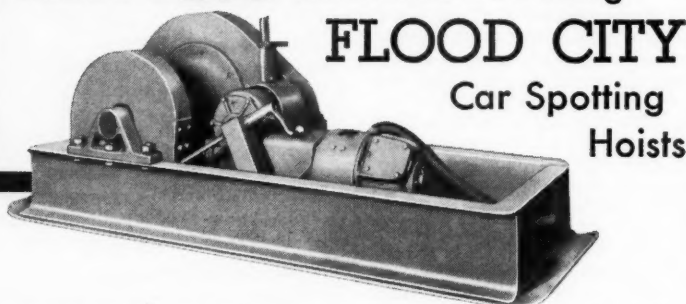
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Wins Safety Title

The team from the Sonman Mine of Eastern Gas & Fuel Associates, Portage, Cambria County, Pa., is the winner of the 13th annual state first-aid contest for coal mine safety teams. Pittsburgh Consolidation Coal Company's Mathias Mine was second and the Cardiff Mine of Imperial Coal Co., third.

The contest was held at the second annual Pennsylvania coal festival on September 10.

John L. Has Slight Heart Attack

John L. Lewis' physician has reported that doctors had decided the veteran head of the United Mine Workers had a very minimal heart attack in mid-September. The 75-year-old UMW chief entered emergency hospital in Washington, D. C., September 23 for what was then described as a rest and checkup. At that time his doctors said it was "very questionable" whether Lewis had suffered a heart attack, but it has since been decided that he had suffered a "slight one."

Germany in Titanium

West Germany is off to a fast start in its effort to become the world's leading producer of titanium metal.

The Germans are the only nation on the Continent and one of only three nations in the world, in fact, producing titanium in volume. United States and Canada are the others.

Two German firms—Krupp and Deutsche Edelstahlwerke—recently exhibited a wide variety of articles made of titanium, among them strip and sheet metal screws and pipes.

Gulf Smokeless Buys Two Coal Companies

W. P. Tams, Jr., president of Gulf Smokeless Coal Co., disclosed early in October that his company had purchased the MacAlpin Coal Co. and Winding Gulf Collieries Co. properties. All three coal companies operate in southern West Virginia.

Tams has reported that the purchase brings Gulf Smokeless Coal Company's coal holdings to 40 to 50 million tons of Pocahontas seam reserves.

Winding Gulf Collieries will continue to operate for the present under the same name and with the same local personnel. Justus Collins will retire as president of Winding Gulf and E. E. Jones will retire as vice-president of operations of the company. Tams will serve as president and general manager of Winding Gulf.

MacAlpin Coal Co. is disposing of its corporate holdings and was bought to be operated as the MacAlpin mine of Gulf Smokeless.

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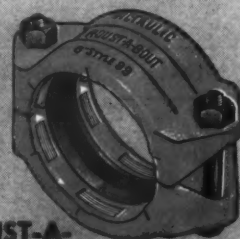
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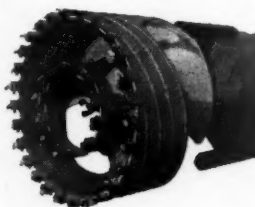


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GENERAL SPECIFICATIONS — MODEL 28

Length: 28 feet
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Flying Quarry-Men

New York Trap Rock Corp. recently purchased a helicopter for use by executive personnel supervising operations of the company's four plants at Haverstow, Clinton Point, Tompkins Co., and Berplanck, N. Y.

Drilling Symposium

The fifth annual drilling symposium was held by the University of Minnesota at the Continuation Center on the Minneapolis campus, October 13-15. Attention of the symposium this year was directed to the use of tungsten carbide in small hole rotary exploration drilling. The meeting began with an exposition of the metallurgical characteristics of tungsten carbide, then went into the technical details of mounting inserts in core and non-core bits. This was followed with testimony as to the performance of bits in the United States and elsewhere. In addition there was a discussion of the use of combined rotary and percussion methods with tungsten carbide bits. The symposium closed with a Saturday morning round table for general discussion of topics of interest in the growing profession.

West Virginia Clean Streams

Reclamation of some 189 miles of fishing waters has been made possible by exceptional progress in abating stream pollution on the Coal River drainage basin, the Big Coal and Little Coal rivers and their tributaries in Southern West Virginia, according to the State Conservation Commission. The Commission has committed itself to stock 20,000 smallmouth bass the day the river is clean to aid the "great river" in its return back to normalcy. Some stocking already has taken place.

Start Coal Pipeline

The laying of the first section of the 106-mile coal pipeline from the Georgetown cleaning plant of the Hanna Coal Co. to Eastlake, near Cleveland, Ohio, began October 4. At that time work started on the first 30-mile section northward to Station 2, which will be the first in a series of pumping stations along the route to Cleveland.

Williams Bros. Co. of Tulsa, Okla., is building the pipeline which is expected to be completed next year. At that time pulverized coal will be mixed with water and pumped through the line. At the Cleveland terminus, coal will be separated from the water and sent to a Cleveland Electric Illuminating Co. plant. The line will be the first major conveyor of its kind in the world and will have a capacity of 1,200,000 tons a year.

Leases Coal Land

Pocahontas Fuel Co. has leased and optioned mineral rights on approximately 19,000 acres of valuable coal land in Wyoming County, W. Va., from W. M. Ritter Co. The Ritter firm, the parent organization of Red Jacket Coal Corp., retains surface rights, according to terms of the lease. The Ritter company cut timber from the land several years ago and much of the territory has second growth timber that will be marketable in a few years.

Pocahontas Fuel reports that it has no immediate plans for development of the territory, but is acquiring the land in conjunction with the company's long-range expansion program.

Blueberry Headframe Down

The Duluth Iron and Metal Co. has completed dismantling of the headframe and other surface structures of the Blueberry iron mine located just west of Ishpeming on the Marquette iron range of Michigan. The Blueberry mine was opened in 1926 by the Ford Motor Co., which operated it until 1933. In more recent years it was operated by the North Range Mining Co. of Negaunee. Active operations at the mine were concluded some time ago. The mine had been opened to a depth of 16500 ft and was worked by the top slicing and stoping method.

New River Dock

Island Creek Fuel and Transportation Co. completed a new river terminal at Kenova, W. Va., early in October. The terminal includes a large conveyor belt which can handle approximately five barge-loads of coal in an eight-hour day. It carries the coal from the Norfolk & Western Railway to the barges.

Principal reason for the terminal according to J. J. Foster, vice-president of Island Creek, was to give a direct connection between the mines and a river outlet.

Vocational Committee Meets

The Vocational Training and Education Committee of the National Coal Association met at Michigan College of Mining and Technology, Houghton, Mich., on October 7 and 8. A tour of the campus during the morning of October 7 was followed by a lunch in the Memorial Union. Dr. Frank Kerekes, Dean of the faculty, gave a welcoming address in which he presented statistics in regard to enrollment of students in engineering in United States and at the College.

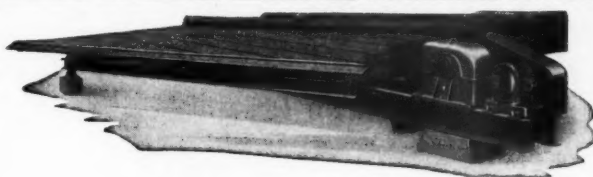
In the afternoon there was a discussion of curricula by heads of the various departments. Professor J. Murray Riddell outlined the instruc-

tion given in the Department of Mining Engineering. Professor H. W. Drier, representing Professor C. T. Eddy, commented upon instruction in metallurgy. Mineral dressing was described by Professor N. H. Manderfield. Courses in geology were outlined by Professor A. K. Snelgrove. The session closed with a report on geophysics by Professor W. A. Longacre.

Dr. Grover C. Dillman, president of the College, addressed the gathering after dinner in the evening and related the history of the College, comment-

ing briefly on the careers of a few distinguished graduates.

At the conclusion of the meeting the Vocational Training and Education Committee expressed its concern in regard to the employment of college graduates by coal companies. Michigan College of Mining and Technology, and at other colleges, students are being well trained for useful employment in the mining industry. The coal industry is missing a great opportunity, the committee felt, if it fails to employ its proper share of those who are available.

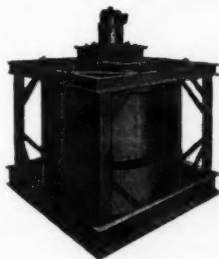


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Drill in Blind River Area

Stanleigh Uranium Mining Corp., Ltd. of Toronto, Ont., a company sponsored by Standard Ore and Alloys Corporation of New York City is making progress on its 18 square mile Blind River property, adjoining the Algom holdings at Elliot and Nordic Lakes, Ont.

Five drills are presently in operation, employing 27 men.

Frictional Ignition

(Continued from page 36)

are considered less dangerous than sandstone, but some bituminous sandstones, which look like shales, can produce incandescence sparks. It has been found that rocks with less than 35 percent quartz can give dangerous sparks. There is some indication that the moisture content of rocks may affect their incandescence.

In contact between rocks and metals the nature of the rock is far more important than that of the metal. Although little if any difference was observed between various steels in contact with rocks, in high-speed machine operations the surface hardness of the metal might have an effect. Sharp glancing blows prove most effective in producing ignitions by friction between steel and sandstone. In contact between steel and pyrite, the most hazardous conditions occurred during rubbing or sliding friction, which produces fine dust. In tests with cutters, the sharpness of the bits was found to be an important factor. Blunt bits are more hazardous than sharp bits because they produce more fine coal dust and upon encountering pyrite may produce and ignite pyrite dust. Another important factor in cutting or drilling is overloading machines; this can produce much heat and bring about conditions that lead to ignition.

In metal-to-metal contact the properties of the more readily oxidizable metal normally determine the degree of ignition hazard. The hardness, melting point, ignition temperature, specific heat, heat conductivity, and brittleness of the metals all play a role, in that they determine the size, duration, temperature, and heat capacity of the incandescence sparks. Increase in the carbon and silicon contents of steels and rust on the steel surfaces promote the formation of incandescence sparks during friction. Painting the steel surface, as with zinc coating, reduces the incandescence. Painting with aluminum may increase the ignition hazard, particularly on rusty steel.

During friction between light alloys and steel, the ignition hazard increases with the magnesium content of the alloy. Contact between aluminum and steel, particularly rusty steel, also gives incandescence sparks under some

conditions. The incandescence of metals seems to be related to their reactivity, as indicated by their position in the electropositive series of metals. In British coal mines the use of light metal alloys is being restricted or entirely discontinued.

Prevention of Ignitions

Experience and research have demonstrated that friction and impact between machines and minerals can produce firedamp ignitions during many operations in coal mines. Although the presence of frictional sparks is a warning of potential danger, it should be remembered that hot spots on the contacting surfaces can cause ignitions without visual sparking. To avoid ignitions, gas accumulation and frictional heating or frictional sparks must be prevented.

The most important measures that can be taken for prevention of gas ignitions by friction are: the provision of adequate ventilation at the coal face; the use of enough air and water in cuts; frequent checking for gas in the atmosphere; design and use of mining machines so as to facilitate rapid removal of gas; avoidance of overheating of cutting and other machines, and avoidance of hard rocks during cutting and drilling.

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Western States

Nevada Mercury Production

United Mercury Corp. has announced it will begin production immediately on its property in Antelope Valley, about 65 miles southwest of Battle Mountain, Nev. A water system, ore bins, conveyors and other processing facilities are now ready for operation and piers have been constructed for the placing of a kiln of 100-ton per day capacity. The ore is being stockpiled at present.

Bear Creek Closes for Winter

Bear Creek Mining Co., a subsidiary of Kennecott Copper Corp., has shut down its exploration activities for the winter at its Glacier Peak, Wash., prospect in the Cascade Mountains. About 6800 ft of diamond drilling, as well as extensive geologic mapping and surveying were accomplished this summer, according to Lowell B. Moon, mining geologist in charge of the company's Spokane district office. Up to 25 men were employed at the property.

Uranium Ores Identified

Uranium minerals in Northern Ferry County, Wash., have been identified by the Atomic Energy Commission as euxenite, betafite, brannerite and uraninite. This brings to eight the number of uranium minerals which the AEC has identified in northeastern Washington. The others are autunite, gummite, uranophane and pitchblende.

El Paso Convention

The International Mining Days Celebration in El Paso, Tex., September 29, 30 and October 1, drew a crowd of approximately 700.

The technical sessions at the meeting included discussions of "Electrolytic Precipitation of Copper with Iron" by Dr. J. C. Rintelen; "Leaching of Mixed Ores at Inspiration" by C. B. Kettering; "The Importance of Geologic Information and Ore Testing to Mill Design" by H. P. Nicholson; "The Domestic Uranium Production Program" by Sheldon P. Wimpfen; "Geologic Thinking in the Discovery and Extension of Mineral Projects" by J. E. Allen; "Southwestern Ore Districts in the Structural Frame-

work" by Dr. E. B. Mayo; "Uranium at Mi Vida Properties" by Charles A. Steen; "Saline Water and Its Purification" by Dr. J. Hancock; "Mechanical Loading from Draw Points" by E. Kipp; "Ventilating and Air Conditioning of the Magma Mine" by A. B. Short; and "Recent Developments in Deep Drilling Practice" by W. W. Long.

Members of the New Mexico Mining Association elected the following officers for the coming year: President—J. B. Knaebel, manager, New Mexico Operations, The Anaconda Co., Grants, N. M.; first vice-president—J. K. Richardson, assistant general manager, Chino Mines Division, Kennecott Copper Corp., Hurley, N. M.; and second vice-president—H. H. Bruhn, resident manager, U. S. Potash Co., Carlsbad, N. M.

Famous Producer Sold

The National Mine, southeast of McDermitt, Nev., has been sold by the Adele Walker Trust of New York City to the Wheelch Mines Co., Caldwell, Idaho. The Wheelch firm is now attempting to relocate the ore body which produced millions of dollars of gold-silver ore before operations ceased.

Lucky Friday Moves Ore

The 7000-ton stockpile of Lucky Friday Silver-Lead Mining Co. is now being trucked to the Morning Mill of the American Smelting & Refining Co., at Mullan, Idaho, at the rate of about 350 tons a day, according to Dave Elder, superintendent. Meanwhile mine production at Lucky Friday is continuing to average between 100 and 110 tons of ore per day and is coming from drifts on the 2300 and 2150 levels and from stopes on the 2000, 1800 and 1600 levels.

Nevada Tungsten

The exploration subsidiary of United States Smelting Refining & Mining Co. has purchased 55 percent interest in the Diamond Jim mine near Mountain City, Nev. The tungsten-producing property consists of 37 claims located about 75 miles north of Elko.



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Reach Ike Vein

Bunker Hill & Sullivan Mining & Concentrating Co. reached the Ike vein on the new 27 level at its big Bunker Hill mine at Kellogg, Idaho, in early October. According to reports, only a portion of the structure has been exposed and the crosscut from the shaft is being continued until it is certain that the entire width of the ore zone has been opened.

The Ike vein was found approximately "in place," as projected from upper exposures, about 1100 ft north of the Emery vein which was opened on the new deep level about five months ago. The 27 level is 1200 ft below sea level, the deepest workings in the Coeur d'Alene mining district.

Utah Air Pollution

Columbia-Geneva Steel Division of the U. S. Steel Corp. has announced the completion of a multi-million dollar electro-static precipitation plant at its Geneva works to control the problem of air pollution.

Installations for air cleaning were made at both the sinter plant and the open hearth furnaces. At the furnaces, all gases from 10 open hearths are collected in a flue and redispersed to eight treatment units, which treat upwards of 50,000 cu ft per minute.

Haggard and New Progress

The Oregon State Department of Geology and Mineral Industries reports that the Comstock Uranium-Tungsten Co., Inc., of Elko, Nev., which took over the Haggard and New mine in Grant County, Ore., in April, has recently purchased the mill built by Burt Hayes and associates. The company is in the process of reconditioning the mill and increasing crushing and tabling facilities. A development tunnel is being driven on the mine to open the ore body at a depth of some 40 ft below the present workings.

Kaiser Aluminum Boost

Production of primary aluminum will be increased by 3,000,000 lbs. a year at the Kaiser Aluminum's Mead, Washington reduction plant by the addition of 16 reduction cells, according to Lloyd A. Amos, plant manager. The improvement at Mead is part of a \$90,000,000 expansion program involving five of Kaiser's principal manufacturing plants.

The expansion involves adding pots to each of the eight existing pot lines and will cost \$300,000. A similar program is being undertaken at the Kaiser Tacoma Aluminum Reduction Plant. The combined programs are expected to boost Kaiser's primary capacity to 828,600,000 lbs. a year.

MINING CONGRESS JOURNAL

Reopen Palisade Iron Mine

J. R. Simplot Co., Boise, Idaho, has announced it will reopen its Palisade iron ore mine in Eureka, Nev., under a contract with Japanese steel mills.

It is reported that the company will mine and ship 2000 tons of ore daily for shipment to Japan by way of the Port of Stockton.

The ore does not come up to direct shipment standards of American mills, but has been worked off and on in the past. Most recently was the large-scale operation during the Korean War when it was reopened to supply Japanese mills.

Terminate Uranium Ore-Buying

The American Smelting and Refining Co., which since 1948 has been conducting uranium ore-buying and concentrate-receiving functions on behalf of the Atomic Energy Commission, has notified the Commission that it will terminate these activities at the expiration of the present contract on December 31, 1955.

At present, AS&R is operating, on behalf of the Commission, ore-buying stations at Monticello, Marysville, Moab and White Canyon, Utah; Edgemont, S. Dak.; Globe, Ariz., and Riverton, Wyo. They also operate the concentrate sampling plant at Grand Junction where uranium and vanadium concentrates from all of the processing mills are received, weighed, and assayed as a basis for payment to the mills for the product.

Borax Expansion

Pacific Coast Borax Co. Division of Borax Consolidated, Ltd., has started work to convert its present system of mining at Boron, Calif., to open-pit and to construct new concentrating and refining plants at such mine site.

Recent developments in technique and equipment now make possible the recovery of virtually the entire ore body at Boron by open-pit methods. The company reports that substantial increases in demand which have occurred since the war and the likelihood of still larger requirements in the reasonable future make this project economically justifiable. The improved ore recoveries which can be expected will greatly extend the life of the mine.

Since the character of the ore recovered by open-pit methods will be somewhat different from that hitherto obtained by more selective methods a substantial change in process had to be developed to yield optimum results. The new concentrating and refining plants to be erected at Boron will handle all grades and varieties of ore and will produce borate concentrates required for the export trade and the principal forms of refined Borax for domestic and foreign markets. These

refined Borax products have hitherto been produced at the company's refinery at Wilmington, Calif., some 135 miles away.

The Wilmington Refinery will be maintained and will continue to produce Boric Acid, special borate compounds and the famous 20-Mule Team Package Products.

The new facilities will cost around \$18,000,000 to complete and are expected to be in operation around the second half of 1957.

Washington Tungsten Mill

Construction of a 25-ton mill to process production from the Addy Mining Co. tungsten property in Stevens County, Wash., west of Addy, is now in progress and is expected to be ready for operations the middle of November. The new concentrator will handle production from an 18-inch vein of ferberite and scheelite ore, according to R. J. Weller, president of the company and builder of the new mill.

Toquepala Development

Edward McL. Tittmann has been elected president and chief executive officer of the Southern Peru Copper Corp. Tittmann has been general manager of the Western Department of American Smelting and Refining Co. in Salt Lake City, Utah.

Southern Peru Copper Corp. is currently undertaking the development of the large Toquepala copper deposit in Southern Peru. The corporation is jointly owned by American Smelting and Refining Co., Cerro de Pasco Corp., Newmont Mining Corp. and Phelps Dodge Corp. Its directors, in addition to Tittmann are: Roger W. Straus, Kenneth C. Brownell, R. F. Goodwin, R. Worth Vaughan, J. D. MacKenzie and Arthur C. Hall of American Smelting and Refining Co.; Robert P. Koenig and H. Danforth Starr of Cerro de Pasco Corp.; Plato Malozemoff and Marcus D. Banghart of Newmont Mining Corp., and Louis S. Cates and Robert G. Page of Phelps Dodge Corp.

The Export-Import Bank of Washington recently announced the signing of a loan agreement with Southern Peru in an amount not exceeding \$100,000,000 for the purpose of assisting in financing the United States dollar cost of carrying out the Toquepala project. The remaining financing of the \$205,000,000 project will be provided by the four participating companies.

Southern Peru's copper deposits, which include the Cuajone and Quellaveco deposits as well as the Toquepala deposits, are among the largest in the world. The Toquepala deposit is located about 56 miles inland from the Port of Ilo in southern Peru.



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PATTIN expansion shells are available and serviced exclusively through The Colorado Fuel & Iron Corp., Denver, Colorado.

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Homestake Develops Nevada Uranium

The Homestake Mining Co. has acquired a lease and option for 18 uranium claims, located seven miles west of Pyramid Lake, Nev. The road to the mine has been completed and a crosscut adit has been started to intersect a vein-type deposit, according to Richard J. Stoehr, resident engineer.

Idaho Rejects Placer Lease

The Idaho State Land Board has rejected an application for a placer mining lease on State lands on the Moyie River near the Canadian border. In doing so, it took note of the fact that the City of Bonners Ferry claims the operation would jeopardize its power supply. The application was also opposed by sportsmen's groups who claimed it would muddy the stream and interfere with fishing.

Options Canadian Monazite Property

Lindsay Chemical Co., West Chicago, Ill., has obtained a two year option on a monazite lode deposit in northwestern Saskatchewan. The option covers 18 claims in the CE group in the Lake Athabaska mining dis-

trict of Saskatchewan near Uranium City.

The radioactive ground was discovered in 1954 by John H. Wilson, an Edmonton, Alberta carpenter, through an air-borne scintillometer prospecting survey. Samples of the monazite were submitted by Wilson to Lindsay Chemical Co. late in 1954, and they were sufficiently interesting to Lindsay to warrant further investigation.

The monazite deposit is in a north-west trending fault breccia zone at a formational contact between amphibolite and granite gneiss associated with pegmatites. Accessory minerals are biotite and pyrite.

No Accidents in Five Years

A crew of 102 men who have worked over 1,000,000 man hours in five years without a lost-time accident have set a new safety record at the famous Bingham Canyon copper mine of Kennecott Copper Corp. This is in the face of the fact that work is being performed under all types of working conditions at the huge open-pit mine.

Joseph H. Harker, general foreman of the crew, attributes the exceptional record to "safety mindedness" on the part of all foremen and their men.

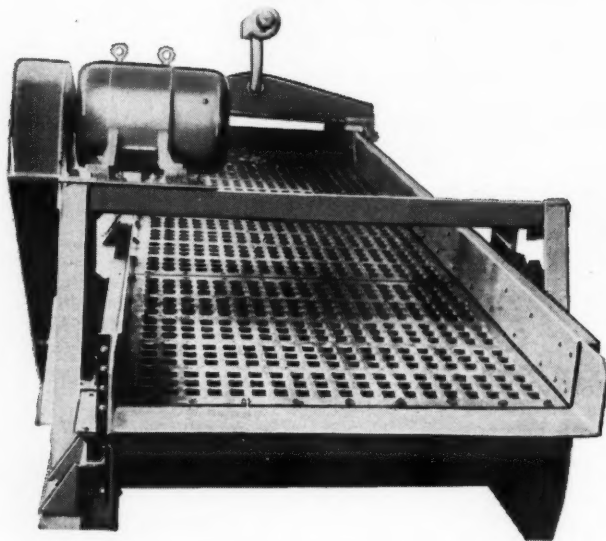
The 102-man crew makes up the water service department at the mine. Their job is to lay and keep in repair many miles of heavy water, oil, gas and air lines. The crew also installs and services all pumps for the mine and the waste dump leaching operations. This work takes them into underground tunnels and shafts where working conditions are not always the best.

Ray F. Gough, safety director for Kennecott's Utah Copper Division, said this record tops that of any other department at the mine. The record represents a total of 138,584 working shifts, or 1,108,672 man hours of labor.

Southern Pacific Exploration

The Southern Pacific Co. is now engaged in an eight-year program to explore its lands for mineral deposits, according to Louis B. Young, assistant to the president. Four two-man teams under the direction of Lawrence B. Wright, chief of explorations, have been in the field about five months and have scheduled their operations to explore each area during the most favorable period of weather. So far, they have conducted their prospecting activities in the Mojave Desert, the area near Lovelock, Nev., and the area west of Dunsmuir, Calif.

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Chino Drill Holes

(Continued from page 76)

erly confine the gases and the number of "blow outs" has decreased markedly since the introduction of 12-in. holes. A comparison of two shots, approximately two and one-half years later is indicated in Table II.

As previously mentioned, "back-break" is an important function in blasting. The statistics given indicate the "calculated" tons of rock broken per pound of explosive and do not take into consideration additional broken tonnage contained in "back-break." Calculations made by the engineering department on several blasts indicated that tonnage actually mined from blasting 9-in. holes ranged from 8 percent to 9 percent more than calculated and tonnage actually mined from blasting 12-in. holes ranged from 15 to 18 percent more than calculated.

Subsequently, all of the other drill rigs were modified to use 12-in. tools, albeit they are not as efficient in drilling as the larger drills because they do not swing as heavy a string of tools. For the past three years Chino Mines has been using nothing but 12-in. drill holes and increased knowledge and experience has raised the powder factor from slightly more than 4 to 6½ tons of broken rock per lb of powder.

Rotary Drill Being Tried

When rotary drilling became of interest to open pit porphyry mines, the first rigs were capable of drilling holes only slightly in excess of six in. in diameter. We at Chino watched this with a great deal of interest to see whether this type of drilling would be feasible in rock such as generally encountered in the southwest porphyry coppers. When it became apparent that rotary drills could be successful, Chino Mines began negotiating for a 12-in. rotary drill rig. We, at first, were informed that they were not available, that you could drill so much more hole so much more cheaply with one of the smaller drill rigs that they could better be utilized. However, since we had experienced improvement in blasting efficiencies through the use of large diameter holes and did not want to lose the advantage, we waited until we could obtain a 12-in. rotary drill. This drill was delivered in the first half of this year and the results obtained have been highly satisfactory. The drilling rate exceeded expectations although so far we have drilled on only two benches. The rotary drill has been three times as fast as the churn drills on these benches and we are pleased with the potentialities of this rig.

We are convinced that the use of 12-in. blast holes in pits utilizing rail haulage is superior to holes of lesser diameter and we are aware of no reason why they should not be successfully utilized in other open pit mines provided the bank height is not less than 40 ft.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.
OF THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1955.

City of Washington,
District of Columbia, as:

Before me, a notary public in and for the state and county aforesaid, personally appeared Robert W. Van Evera, who, having been duly sworn according to law, deposes and says that he is the Editor of THE MINING CONGRESS JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor and business manager are:
Name of publisher, The American Mining Congress, Washington, D. C.
Editor, Robert W. Van Evera, Washington, D. C.

Business Manager, P. D. McMurrer, Washington, D. C.

2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young, St. Louis, Mo.; Executive Vice-President and Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

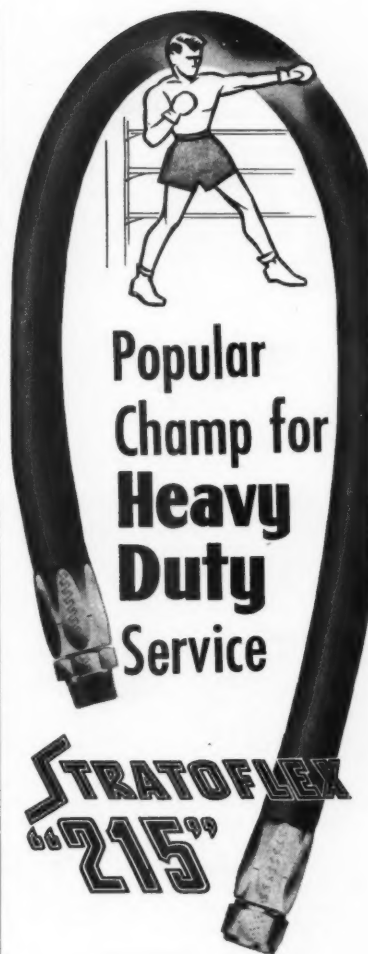
ROBERT W. VAN EVERA,
Editor.

Sworn to and subscribed before me this 20th day of October, 1955.

KATHRYN A. HATHAWAY,

Notary Public.

(My commission expires July 31, 1957.)



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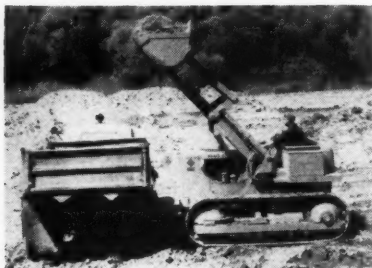
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Manufacturers Forum

Tractor and Tractor Shovel

Allis-Chalmers has announced two new diesel-powered units . . . the 12,400-lb HD-6 crawler tractor and the 19,600-lb HD-6G tractor shovel with a rated capacity of 1½ cu yd.

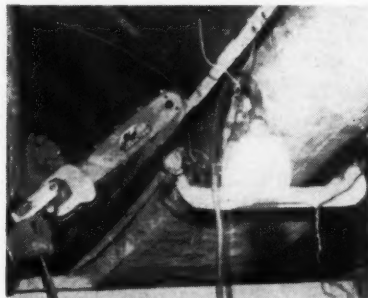


The heart of the HD-6 and HD-6G's newly engineered power train is the Allis-Chalmers HD-344 diesel engine, a four-cylinder, four-cycle unit that develops 57 net flywheel hp, 45 hp at drawbar and 55 hp at the belt.

In the HD-6 the maximum drawbar pull is approximately 12,650 lb. It has five forward speeds ranging from 1.5 mph in first to 5.5 in fifth gear, and 2 mph in reverse. The HD-6G has four forward speeds which also range from 1.5 to 5.5, and two reverse speeds at 2 to 4.1 mph.

Air-Driven Chain Saw

Mall Tool Co. has introduced a new pneumatic chain saw to the mining and construction industries. Called the



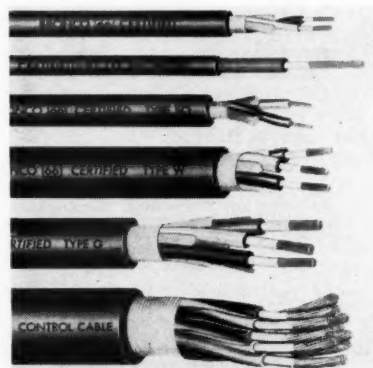
Model 2P18, the pneumatic saw has a ¾-in. chain. Cutting bars are available from 18 to 30 in. long. The unit is powered by a rotary air motor that requires 46 cfm at 90 psi for maximum efficiency, according to the com-

pany. It is possible to cut through timbers without clearance, the company reports. The round nose of the cutting bar is "plunged" into the timber, making it possible to cut a timber even if it is hemmed on three sides. For further information contact the Mall Tool Co., 7725 South Chicago Ave., Chicago 19, Ill.

New Cable Line

Western Insulated Wire Co. of Los Angeles is now manufacturing a complete new line of portable electrical cords and cables bearing the name Bronco 66 Certified.

The outer protecting jacket of Bronco 66 Certified contains not less than 67.32 percent new Neoprene, the



company reports. The Cable has received official approval by the Pennsylvania Department of Mines and acceptance for listing by the Federal Bureau of Mines.

The Western Insulated Wire Co. main plant is located at 2425 East 30th St., Los Angeles 58, Calif.

Uranium Extraction Tests

Dorr-Oliver Inc. announces that their Westport Mill Laboratories at Westport, Conn., are now fully equipped to handle all types of uranium extraction studies. A recent expansion of analytical, ion-exchange testing and other facilities has now made it possible to process small quantities of uranium ore at this location through all stages from the raw mined ore up to and including the yellow cake.

Logging Probe

Mr. Sopris Instrument Corp. has announced its new model DP-165 Scintillation Counter Gamma Hole Logging Probe and Ratemeter. The instrument is intended for use with hoisting equipment, for detection of uranium, stratigraphy, lithology, and potentially for in-hole spectrometry. The company says that the high counting rates of the scintillation permits faster logging and much greater detail of geological features.

Flocculating Agent

Development of a new synthetic resin flocculating agent for use in disposal or recovery operations involving clarification, sedimentation, or filtration has been announced by B. F. Goodrich Chemical Co. It is called Good-rite K-720. Technical literature on the new flocculating agent may be obtained by writing the company, at the Rose Building, Cleveland 15, Ohio.

4X-7.50 Rok-Bit

Brunner & Lay Rock Bit Corp. has designed a carbide-insert bit especially for use on J-7.50 threaded drill rods. It is available in 4-4½-in. gauge sizes and is made to fit directly on the steel without the need for an adapter.

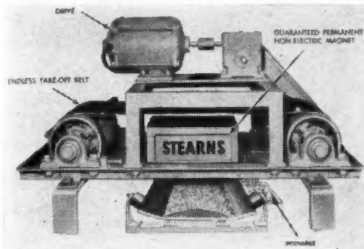
The bit has a center hole, two additional holes on the face and two more on the sides—five air holes in all. According to the manufacturer,



Brunner & Lay Rock Bit Corp., 9250 King St., Franklin Park, Ill., the bit stays sharp longer, drills faster, more economically and requires less reconditioning.

Self-Cleaning Permanent Magnet

Stearns Magnetic, Inc., Milwaukee, manufacturer of Electro and Permanent Magnetic Separation and Transmission Equipment, has introduced a new line of "Discardo" Cross-belt Magnetic Separators that remove tramp iron and automatically discharge it away from the flow of material in a



continuous operation. Iron is attracted to the magnet face where a cleated endless belt automatically carries it out of the magnetic field to discharge away from the conveyor or chute.

The separator is available in various sizes, suitable for suspension up to four in. above the material flow.

Big Truck

Kenworth Motor Truck Corp. of Seattle announces the design and manufacture of a new earthmover truck-tractor with dump semi-trailer, called the 802-B.

The first six units built have been delivered to Isbell Construction Co. of Reno, Nev., for use in hauling copper



ore from mine to mill on a project in southern Arizona.

With a capacity of 32 cu yd (struck), the vehicle's gross combined weight is 165,000 lb. The 802-B is powered by a 300 hp turbo-charged Cummins NRT-600 diesel engine. In dumping, the entire trailer raises, and the rear trailer wheels move forward to a position directly behind the tractor tires. The fifth wheel is equipped with a ball and socket which provides complete flexibility in the dumping operation. A special guide and equalizer stabilizes the body when dumping, so that there is no strain or twist on the twin, three-stage Kenworth telescopic hoist.

—Announcements—

K. E. Caine has been promoted to Pittsburgh district manager of Goodman Manufacturing Co.

Harold R. Middleton has been appointed sales manager of the Laubenstein Mfg. Co., Ashland, Pa. He previously had been with Wilmot Engineering Co. as manager of sales promotion and advertising.

Announcement has been made of the appointment of Dudley B. Reed, Jr., as director of advertising and public relations for Marion Power Shovel Co., Marion, Ohio. Harold E. Bonecutter continues as advertising manager for the company. At the time of his appointment Reed was manager of public relations for Bucyrus-Erie Co.

Joy Mfg. Co. announces the following executive changes:

Herman Van Houten, former staff specialist and special representative for the Pittsburgh Executive Sales Department, is now sales manager, Renewal Parts.

R. T. Hair, until recently manager of service on all company products, has been appointed to manager, Continuous Miner and Loader Products.

W. E. Overturf, former manager, field service, has been named service manager, mining products.

Earl Bradley, former special demonstrator, coal machines, is now manager, Shuttle Car Products.

American Wheelabrator & Equipment Corp., Mishawaka, Ind. announces that it has changed its corporate name to Wheelabrator Corp. The move does not involve any alteration in the ownership, management, or operation of the company.

Election of E. P. Allis, president of The Louis Allis Co. since 1945, to the post of chairman of the board and promotion of John W. Allis from vice-president to president, was announced August 8 by the Board of Directors of The Louis Allis Co. E. P. Allis stated that he had recommended that the Board take this action in advance of his retirement in 1957 to enable him to continue to work closely with the new president.

C. R. Boll, vice-president — sales, Cummins Engine Co., Inc., Columbus, Ind., has announced the formation of a new Cummins Distributor

for Michigan and the seven counties surrounding Lucas County (Toledo) in Northern Ohio. Name of the new firm is Cummins Diesel Michigan, Inc., and its headquarters is at 3601 Gratiot Ave., Detroit, Mich.

Heading the new firm are: L. W. Childs, president, and J. S. L. Shales, vice-president.

CATALOGS & BULLETINS

CONTROL DEVICES. General Electric Co., Schenectady 5, N. Y. This is a new 68-page catalog of general purpose control devices, including a special section correlating by horsepower components for each type of motor control application. Motors, book prices, wiring diagrams, and dimensions on motor starters, contactors, relays, solenoids, switches, push buttons and pilot devices are included. Write the General Purpose Control Dept. at the above address and ask for Bulletin GEC-1260A.

DRILL SUPPLIES. Acker Drill Co., Inc., Scranton, Pa. This new catalog contains a complete and up-to-date listing of all drilling tools and supplies used for mineral prospecting, which are handled by the Acker Drill Co.

FLEXIDYNE. Dodge Mfg. Corp., Mishawaka, Ind. Bulletin A-640 furnishes complete engineering data on the Flexidyne drive and coupling. The bulletin also shows two methods of selecting the proper dry fluid drive unit with easy to use selection charts. Two pages are devoted to recommended V-belt drives for all Flexidyne sizes.

MARION EQUIPMENT. Marion Power Shovel Co., Marion, Ohio. Bulletin 403-C describes the complete line of excavating materials and handling machine being offered by the Marion Power Shovel Co.

MILL AND KILN GEARS. The Falk Corp., Dept. 255, 3001 W. Canal St., Milwaukee 8, Wis. Engineering report 6170 clearly illustrates with drawings and photographs the design and characteristics of the various types of ring gears which have been employed to drive ball mills, rod mills, hoist or kilns, and indicates the performance which may be expected from these ring gears. The report is actually a condensed treatise on the selection and design of gearing for use on mills, kilns and hoists.

SIXTY-FOUR QUESTIONS AND ANSWERS ON GEIGER COUNTERS AND SCINTILLATORS. Precision Radiation Instruments, Inc., 4223 W. Jefferson Blvd., Los Angeles 16, Calif. This 20-page, pocket-size booklet covers, in layman's terms, such subjects as: claim staking, Government bonuses, assaying of radioactive ores, aerial and ground surveys for uranium, the affect of weather on radiation, use of various types of instruments and many other interesting topics.

WATER SUPPLY PUMPS. Layne & Bowler Pump Co., 2943 Vail Ave., Los Angeles 22, Calif. Bulletin 100 describes the company's line of vertical turbine pumps for industrial and municipal primary water supply. A condensed selection table is included as a guide to horsepower and head-capacity ratings of the Verti-Line Pumps. Detailed drawings of pumping and distributions systems are also included.

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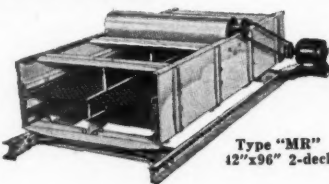
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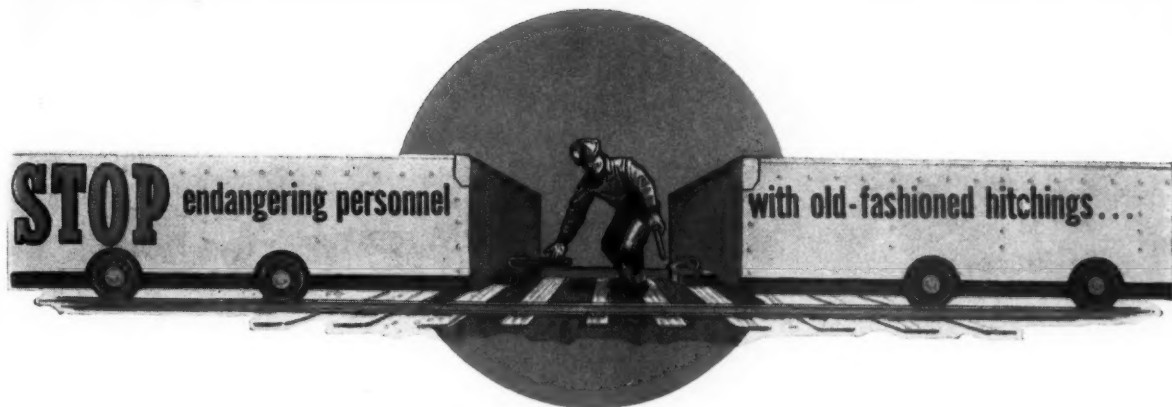
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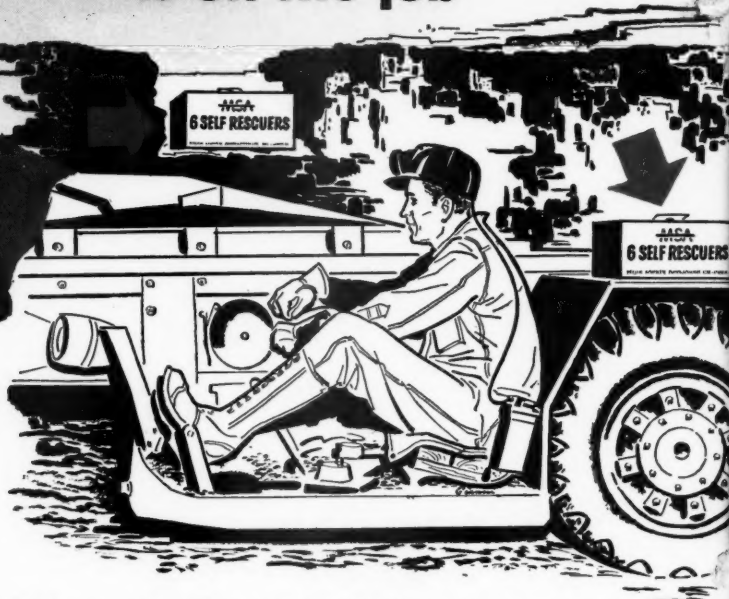
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